UNIVERSITY OF TORONTO
3 1761 01109402 6

Presented to
The Library
of the
University of Toronto
by
Julia Jarvis

HANDBOUND
AT THE
UNIVERSITY OF
TORONTO PRESS

Digitized by the Internet Archive
in 2017 with funding from
University of Toronto

https://archive.org/details/manualofphrenolo00gall

MANUAL OF PHRENOLOGY:

BEING

AN ANALYTICAL SUMMARY

OF

THE SYSTEM OF DOCTOR GALL,

ON THE

FACULTIES OF MAN AND THE FUNCTIONS OF THE BRAIN.

557081
7.2.53

TRANSLATED FROM THE FOURTH FRENCH EDITION.

PHILADELPHIA:
CAREY, LEA & BLANCHARD.
1835.

Entered, according to the Act of Congress, in the year 1835, by Carey, Lea & Blanchard, in the Clerk's Office of the District Court for the Eastern District of Pennsylvania.

PREFACE TO THE AMERICAN EDITION.

The following work, which is founded on information communicated to the Author by Dr. Gall himself, met with great success in France, and rapidly passed through several editions.

In presenting the present translation, the publishers have endeavoured to make it more generally useful, by making such references to the later works of Spurzheim as will readily enable the reader to appreciate the different views of both of these celebrated phrenologists on the situation and importance of certain of the organs; and have added several additional plates in further elucidation of the text.

CONTENTS.

Preliminary Observations on the Study of Man, - 13

PART FIRST.

PRELIMINARY OBSERVATIONS.

1. Object of Cranioscopy—Its Extent—Its Limits and Connexions with other Sciences, - - - 53
2. Opinions entertained by the Learned, on the Mind, Understanding, and seat of the Faculties, at the Epoch when Gall promulgated the principal results of his Researches, - 56
3. Erroneous opinions on the Brain and Nervous System, entertained by Physiologists and Philosophers before the time of Gall, - - - - - - 62
4. Historical View of the Labours and Discoveries of Gall, and the progress of his Ideas on Cranioscopy, - - 67

PART SECOND.

GENERAL CONSIDERATIONS ON CRANIOLOGY, AND THE INTELLECTUAL AND MORAL PHYSIOLOGY OF MAN.

1. Physiological and primary Principles on which Craniology, or Physiology of the Brain is based, - - 72
2. Conditions essential to the Manifestation of the Intellectual and Affective Faculties of the Mind, and the Formation of Thought, - - - - - - - 78
3. Intellectual and moral Nature of Man, and how far he is endowed with Freedom of Will, - - - 83

PART THIRD.

ANATOMY AND PHYSIOLOGY AS CONNECTED WITH CRANIOSCOPY.

1. Of Life, and the principal Systems of Organs that concur in its Production, - - - - - - 89
2. The Nervous System in General, - - - - 92
3. The Great Sympathetic and its Ganglions, or the Nervous System of Internal and Vegetative Life, - - 100
4. Of the Cerebro-Spinal Axis, or the Nervous System of External Life, or that of Relation, - - - - 102
5. Of the Brain, its Hemispheres, its Lobes, and its Convolutions. Hydrocephalus, - - - - - 104

PART FOURTH.

GENERAL CONSIDERATIONS ON THE PRIMARY FORCES OF THE MIND, AND ON THE DETERMINATION OF THE PARTS OF THE BRAIN IN WHICH THEY ARE SEATED.

1. Plurality of Organs in the Brain, - - - 120
2. The Insufficiency of all Attempts, previous to the time of Gall, to explain the Nature of Man and Animals, or their Passions and Propensities, - - - - 127

3. Nature of the Primary Forces, and Determination of their Organs, - - - - - - - 131
4. General Considerations on the Mimicry of the Primary Forces, or the various Forms in which they manifest themselves in Man and Animals, - - - - - 140
5. Reflections on Organology, and the Results of the Action of the Primary Forces, - - - - - 147

PART FIFTH.

ORGANOLOGY, OR A KNOWLEDGE OF THE PRIMARY FORCES, AND DESCRIPTION OF THEIR ORGANS.

1. Physical Love, - - - - - - 155
2. Love of Parents for their Offspring, - - - 158
3. Organ of Attachment and Friendship, - - 161
4. Instinct of Defence of Person and Property, - - 165
5. Carnivorous Instinct, - - - - - - 167
6. Organ of Cunning, Cheating, and Trickery, - - 170
7. Instinct for amassing Riches, &c. Love of Property, 172
8. Instinct presiding over a Choice of Habitation, - 175
9. Love of Power, - - - - - - - 178
10. Love of Approbation, - - - - - 180
11. Circumspection, - - - - - - - 182
12. Sense of Things, - - - - - - 185
13. Organ of Localities, or of the Relations of Distances, - 188
14. Faculty of preserving a Recollection of Persons, and of readily recognizing those we have previously seen, - 192
15. Great Faculty in retaining Names and Words, - - 194
16. Faculty of Speech, and Facility in the Study of Languages, 196
17. Sense of the Relation of Colours, - . - 199
18. Sense of the Relations of Sounds, - - - - 200
19. Sense of the Relations and Properties of Numbers, - 203
20. Sense of Mechanics and Construction, - - - 205
21. Comparative Sagacity, - - - - - 208
22. Depth of Mind, - - - - - - - 210
23. Talent for Wit and Repartee, - - - 213
24. Philosophical Talent, - - - - - - 215
25. Organ of Poetry, - - - - - - 217
26. Moral Sense, - - - - - - - 219
27. Faculty of Imitating the Actions of Others, - - 221
28. Love of the Marvellous, and of supernatural Objects, - 223
29. Organ of Theosophy, - - - - - 225
30. Firmness of Character, - - - - - - 229

APPENDIX.

1. Free-Will, - - - - - - 232
2. Moral Liberty, - - - - - - - 236
3. Good and Evil, - - - - - - 240
4. Application of Gall's Doctrine to different Subjects, - 243
5. Biography and Cranioscopy of Dr. Gall, - - 249

PRELIMINARY OBSERVATIONS

ON THE

STUDY OF MAN.

It is impossible to understand or explain the intellectual and moral faculties of man, without having previously studied his physical organization.

It is as ridiculous to form systems of philosophy to explain the faculties of man, without a proper acquaintance with his internal organization; or to reason on his actions, without having previously studied the organs which concur in the production of these actions, as to attempt to explain the motion of the hands of a watch, without having a knowledge of its internal mechanism. If we were ignorant of the existence of the springs, the number of the wheels, and of their combined action, how should we be able to demonstrate the cause of the difference of speed with which these hands revolve round the dial plate. By observing their motions, the fact of this difference in the space they traverse in the same interval of time may be incontestably established, but this is wholly insufficient to explain the internal mechanism on which the phenomenon depends. Nay, more; a close study of the wheels, and their mutual connexions alone, will not afford the slightest aid in ascertaining their motive power. The ultimate effects of this power may be perfectly comprehended, but to understand its first cause, and to appreciate this properly, the attention of the observer must be directed to the properties and mode of action of the main spring. A disregard of this mode of investigating causes and effects, has occasioned the various errors into which those philosophers have fallen, who have endeavoured to establish systems to explain the faculties of man, without a knowledge of the organization on which these faculties depend. Hence, they have created metaphysical entities to account for effects, which they would have had no difficulty in elucidating, if they had adopted a more rational method.

The truth of our reasoning depends, in most instances, on the distinctness of the ideas we receive of the objects under consideration. If, for example, a physician could demonstrate the principle of life as clearly as the geometrician appreciates the value of the lines of his various theorems; if he could follow, throughout its whole course, the medicine he prescribes, and verify the actions and reactions it occasions in the different organs; he would most incontestably be enabled to predict, *a priori*, the necessary results of the application of his remedies; but, the obscurity which exists as regards the essence of the vital forces, and the nature of disease, as well as the therapeutic operations of medicinal agents, entangles him in an inextricable labyrinth of uncertainties. This is also the case with the metaphysician who seeks for the explanation of mental faculties which he does not understand, in the unknown properties of entities, of which he knows still less. If we would avoid errors, which are not always as harmless as might be supposed, we must sedulously adhere to well demonstrated facts, and not assume as a fact that which has not been substantiated by experience. It must now be admitted, after the fruitless attempts during twenty-five centuries to elucidate the subject, that every system on the human understanding is necessarily an incomplete hypothesis, and contains much that is vague and contradictory. To reduce the sum of our knowledge to what is positive and practically useful, two conditions are indispensable—to renounce all attempts to explain first causes, and to abandon our system of dialectics.

At the same time, I am far from asserting that the writings of Plato, Descartes, Locke, Condillac, Kant, &c., are not replete with instruction. On the contrary, I am convinced that they contain many useful truths; but these truths are enveloped in vain theories, equally unfavourable to the progress of sound reason, and the developement of real truths. What advantages have mankind derived from the categories of Aristotle, or the scholastic cavillings of St. Thomas Aquinas. We may applaud the intentions of Malebranche, in referring everything to God, but what benefit has accrued to science from this method of viewing things? Hence it is important that these modes of reasoning should be abandoned.

II.

The ancients had not an adequate knowledge of the nature of man or of things, to reason with any certainty on either; hence the numerous errors contained in all the systems of philosophy erected by them.

If in endeavouring to appreciate the true state of science among the ancients, and the extent of its applications to the various wants of society, an accurate view be taken of the branches of learning most cultivated, it must be admitted that during the most brilliant epoch of Greece, in the time of Pythagoras, Socrates, Plato, Hippocrates, and Aristotle, that is, three or four hundred years before the Christian era, that no one of these philosophers had attained that degree of perfection and certainty which characterizes the sciences of facts, and which alone are fertile in useful results. The complete ignorance which existed of the laws of nature, of the properties of bodies, and the elements composing them, and their mutual actions and reactions, reduces the benefit to be derived from the few truths that had been discovered, to a very small compass, whether they be applied to the study of man, or the improvement of the arts. The knowledge of minerals was confined to a few practical facts respecting those which were in general use. Botany had not as yet explained either the organization of plants, or any of the phenomena attending their growth and reproduction. Aristotle, who paid much attention to animals, adopted a multitude of erroneous ideas of their manners, habits, and the functions of their most important organs. Hippocrates, who lived a short time previous, although justly celebrated for his medical acquirements, knew still less of them. It appears certain, from many passages in his works, that he had never seen a human brain, and that he was completely ignorant that the nerves were the mediums of feeling or sensation. The Egyptians, among whom the practice of embalming the dead afforded daily opportunities of opening bodies, although better instructed in anatomy on some points, were as ignorant as the Greeks on others. Thus, at this epoch, the two principal foci of civilization, the two sanctuaries in which the arts and sciences were most worshipped—Greece and Egypt—were plunged in the most profound ignorance of natural causes, and had the most vague notions of the internal organization of man.

The other natural sciences, as physics, chemistry, astronomy, &c., were not further advanced. Geometry, although nearly what is taught at the present day, had furnished so little assistance to those sciences, and more especially to astronomy, that it might almost be asserted that these branches of human knowledge did not then exist; and, in fact, the two first consisted almost entirely of occult qualities and magical operations, which were explained by futile hypotheses, and the most fanciful theories. Astronomers filled the heavens with cycles and epicycles, to explain, according to the system of Ptolemy, the stations and retrogressions of the planets; and, with the exception of the golden number or cycle of Meton, and the calculation of eclipses, the remainder of their astronomical knowledge was only a tissue of vain hypotheses, unworthy of being compared with the precision of a true science.

From this epoch, to the time of Pliny, Seneca, and Galen, the knowledge of the structure of man made some progress, for the latter was a great anatomist when compared with Hippocrates. He was acquainted with the brain to a certain extent, and regarded it, in opposition to the opinion of Aristotle, as the seat of the mind, the functions of which he explained as depending on a certain spiritual essence, which he termed *pneuma*, and which he supposed was set in action by the pulsations of the ventricles of the brain; he also admitted the existence of vital, animal, and natural forces, the first of which he seated in the heart, the second in the brain, and the third in the liver. By aid of these, he explained our propensities, our passions, and the manifestation of the faculties of our mind. However, like Hippocrates, he considered these forces as subject to the general laws of nature. Finally, he was perfectly aware that sensation and motion were distributed to all parts of the body, from the brain and through the medium of the nerves. But these new, isolated, and unsupported facts, remained obscured by the host of errors and popular prejudices which were then prevalent.

From this general ignorance of the physical nature of man, and even of the universe, arose, if I am not greatly mistaken, all those futile systems of philosophy bequeathed to us by the ancients, which plunged the human mind in an ocean of chimeras and abstractions, and so long retarded the progress of the experimental sciences, the only guides to a methodical and useful knowledge of man, and his relations to external objects. To this source also, may be attributed that propensity of the Greeks to abandon themselves to the illusions of a vivid and prolific imagination, well calculated to give grace and beauty to all works of their creative fancy, but wholly incompetent to the cultivation of serious studies, like that of moral philosophy, which requires a union of experience, and mature reason; this is confirmed by the following passage from a work which has enjoyed great celebrity. "Among the sages of antiquity," says the author, "moral philosophy became abstract and mysterious; by a fatality, long prejudicial to the whole of the sciences, it neglected experience and facts, to abandon itself a spirit of systems and sects, always contrary to the true progress of reason. No system is to be found emanating from them, based on a proper study of man. Their ethics are only a collection of vague maxims, having no exact interpretation; of detached principles, which are often contradictory, and always enveloped in obscurity. Pythagoras, who was the first to assume the name of philosopher, or friend of wisdom, has left only some obscure and enigmatical precepts, some golden verses, which commentator after commentator, have in vain attempted to render useful. Socrates, who is regarded as the father of moral philosophy, and whose precepts have been recorded by Xenophon and Plato, and embellished by these two celebrated writers with all that the graces of a poetic imagination could add to the beauty and justness of the sentiment, has presented us with nothing but confused theories and ideas, which, although they dazzle by their brilliance, want solidity, and are incapable of affording any solid instruction." Aristotle, though less speculative, has not succeeded better. At the same time, we cannot deny that these distinguished men had just and elevated views of the nature of man, and his relations to the rest of created nature, and entertained profound and sublime notions of the Deity. It must also be admitted, notwithstanding his superficial knowledge of the internal organization of man, that the Coan sage had a tolerably correct knowledge of the *nature* of animated beings, as this word appears to have signified in the language in which he wrote, the totality of the radical forces which preside over the phenomena of the living economy, forces which act, according to him, not under the influence of the will, as they are wholly independent of the mind, but by immutable and necessary laws, fixed by the Creator himself; but, at the same time, they are subject to a certain universal vital force, which is denominated *enormon*, that is, regulating force. The Romans, occupied by the vast project of subjugating the world, left the sciences at the point at which they had received them from their predecessors, and only successfully, though partially, cultivated such as appeared most calculated to subserve their views. This people, almost as much favoured as the Greeks, as regarded climate and genius, and, moreover, endowed with an indomitable courage, appear to me to have been, on the whole, more prejudicial than useful to mankind.

Hitherto, reason had been on the increase; from the epoch of the establishment of the kingdoms of Judah, Nineveh, and Babylon; we do not perceive any decided retrogressions. The Egyptians had considerably increased the knowledge they had received from the Chaldeans. Transported from Memphis to Athens, this knowledge had continued to advance, and when carried from Athens to Rome, if it was not augmented, at least it remained stationary. Pliny, Varro, and some other voluminous writers, detailed all that was known, so that their works may be considered as the first encyclopedias. But, from this time, we find that all the acquirements and traditions of these distinguished nations were gradually lost, and a night of mental darkness enveloped the whole world. Immediately after the era of Seneca and Galen, the study of man, both physical and moral, like that of the other branches of human learning, became extinct. During the ages of barbarism which succeeded, a blind respect for the doctrines of Aristotle and Hippocrates arrested all progress in these sciences; and what renders this event of still more grievous character, two religions, arising at different epochs, and far superior to those which had preceded them, appear to have specially contributed to this deplorable state of things. In fact, whilst one became subdivided into sects, continually warring against each other, and thus absorbing all the attention of their votaries, the other extinguished at a blow all the lights accumulated by the perseverance and labour of twenty centuries. The scandalous and futile disputes of scholiasts and theologians, replaced the study of the useful sciences, and the human race, a prey to petty cavillings, submitted to the double yoke of feudal and sacerdotal despotism; calamities owing, there cannot be a doubt, to the slight knowledge then existing in the exact and natural sciences, which are alone capable of affording solid and durable bases to social order and the happiness of the human race.

III.

Necessity for abandoning the method of the ancients, and the perplexing questions of metaphysics to follow the same method, in the study of man, as is pursued in the natural sciences.

It is fully proved, I hope, that the example of the ancients, and all systems of philosophy on the essence of our faculties, can lead to no plausible and satisfactory explanation of the nature of man; that the appetitive faculty, instinct in general, the intellectual faculty, reason, free will, &c., as described by philosophers, are only occult faculties, resembling those spoken of by the ancient writers, and must tend to arrest the progress of civilization, and induce a multitude of errors as regards the source from which they are derived. In fact, what has been the result of all the doctrines emanating from the sages of Greece, and of those which Descartes, Malebranche, Leibnitz, Condillac, Kant, &c., have successively added to the entelechia of Plato, and the entities of Aristotle? Are we better acquainted with the nature and essence of the mind? has our knowledge of its attributes and faculties, or of free will, &c., been advanced by them? Are all the difficulties which existed, fully resolved? Finally—have we made any progress in self-knowledge? Do we not daily see all the opinions of philosophers and theologians on the metaphysical qualities of mind and soul, reproduced in different forms? All hypotheses of such subjects are necessarily problematical, and at least useless, if not injurious; but, still we find philosophers constantly recurring to them, and unwilling to abandon these futile abstractions. Would it not be a wiser and more judicious course to confine ourselves to a consideration of the material manifestations of our intellectual faculties and moral qualities, which come under the cognizance of our senses? This is the great merit of the system of Gall, which was the first that reduced the philosophy of man to these conditions. What useful end, says he, will ever be attained, by these endless discussions on the incomprehensible union of two such dissimilar substances as soul and body? Whether their union takes place a little sooner or later—whether their reciprocal action be effected by the intervention of a plastic medium, as was supposed by the ancients, or of an ethereal fluid, as asserted by others, or by the result of the immediate intervention of the Deity, as is stated by Malebranche, is what we can never verify. What proves the futility of all these questions, is, that they have not contributed in the slightest degree to advance our knowledge, and that those who have occupied themselves with such discussions, have paid more attention to words than facts. All that we really require, is, to ascertain the motives of our actions, the forces which are the immediate causes of these actions, and what may modify these causes; in fact, to devote ourselves to the investigation of our instincts, propensities, and all other phenomena which concur in determining the character and properties of individuals or species, and not to lose our time in attempting to elucidate such abstract and metaphysical generalities, as sensation, reflection, judgment, memory, imagination, &c., which being qualities common to the whole human race, cannot in any case serve to characterize individuals. Can these latter aid us in explaining our natural propensities, as physical love, friendship, &c., or our special aptitudes, as a talent for music, painting, mathematics, &c? We do not wish it to be understood that we deny the existence of these faculties—all we object to, is their employment as individual characteristics; such a course would be as erroneous as to endeavour to designate any particular substance by the enumeration of the general attributes of all material bodies, as weight, impenetrability, &c.

Man is naturally more inclined to speculation and theory, than to the laborious attainment of facts. To become a distinguished astronomer, nights must be passed in unremitted observavations of the heavenly bodies; to cultivate natural history with success, mountains must be scaled, arid deserts traversed, and the severest privations submitted to. Far different is the case with the man of letters; he, without fatigue, can abandon himself to the reveries of his imagination, and invent systems of philosophy, whilst surrounded with all the comforts and luxuries of life. Gall, with great reason, has reproached psychologists with having indulged too freely in these speculations, and with thus having embarrassed and retarded the progress of natural history and the exact sciences. It is to them, says he, that must mainly be attributed our ignorance of the true nature of man, and of the phenomena of the sensations. Metaphysical cavillings have for ages retarded the investigations of those who cultivated true science, and have prevented their attainment of satisfactory results.

However, it appears to me that at the present day, a perseverance in such an absurd course is impossible, and that the points of resemblance which exist between man and the inferior animals, and the advantages resulting from a close study of them, can no longer be overlooked. All the organs of the former are to be found in the latter; at least in those which are most closely allied to him in configuration. Like them, he is composed of muscles, nerves, blood-vessels, &c., which exercise the same functions; and animals, like man, have propensities, instincts, and aptitudes, are good or bad, docile or savage, are capable of attachment, &c. These points of resemblance which have been admitted by many fathers of the church, fully authorize the comparisons that have been instituted by the most celebrated naturalists, as Buffon, Bonnet, Dupont de Nemours, Geoffroi St. Hilaire, &c., and prove the necessity of connecting the study of man with that of animals.

We must therefore renounce the plan hitherto pursued, of considering the faculties of man in an isolated and separate state, and should never attempt to treat of mind, vice, virtue, free will, &c., except as connected with the other propensities and attributes. To a true philosopher, the psychology of man is part of his natural history —all that can be understood by us are the physiological phenomena; that is, those manifestations of the operations of the mind which are appreciable by the senses. The physical and moral qualities of man form an indivisible whole, and cannot be separated without the destruction of useful links. One of the greatest obstacles ever opposed to a proper knowledge of human nature, says Gall, is, that man has been viewed as isolated from all other beings, and considered as not subject to the same laws that govern them. It is impossible to avoid an eternal confusion of words and ideas, and not to fall into the most absurd errors by pursuing such a plan. Anatomy and physiology, as well as comparative biozoology, are therefore of the highest importance in the study of man. Without them, we should never be able to explain a multitude of interesting facts connected with the history of animated nature. They alone are capable of teaching us, that in individuals manifesting the same faculties, the brain presents the same developements; that the faculties differ when this organ is dissimilar, and that all intelligence ceases, when this important viscus is replaced by a mere system of nerves.

IV.

Bases on which the study of man should rest, to arrive at a more precise knowledge of the phenomena he presents, and to lead to institutions of a more equitable character, and better calculated to promote his happiness.

I do not intend to dilate on the necessity that exists for improving the study of man, that we may institute laws more consonant to his nature and happiness. This is a self-evident truth that few are disposed to deny. But I have some observations to make on the means by which this may be effected. Man is a great problem, which has attempted to be solved since the first dawn of learning, but of which no satisfactory explanation has yet been discovered. Is there any mode by which more determinate results can be attained? It will be perceived that this question is partly answered in a preceding section. And, in fact, by a stricter attention to the wheels and springs of the machine than they received from the ancients, we will necessarily arrive at an explanation more in unison with their visible movements, and thus make one step towards the truth. But, man is an exceedingly complicated machine, and his actions are the more difficult to appreciate, from their being the product of a greater number of causes or forces which are simultaneous and often dissimilar in their operation.

Another mode of arriving at the desired result in investigating the number, nature, and agency of these forces, is to compare them with analogous phenomena produced by similar, but more simple machines.

At the present day, it is probable that but few individuals will be found, except such as are wholly ignorant of the laws of nature, and adhere with pertinacity to antiquated dogmas, who will persist in attributing all human actions to a single and supernatural cause, and in the same breath assert that all analogous phenomena in animals, are the result of mere mechanism. Reason and experience point out that the same causes always produce the same effects; thus, bile, for instance, is secreted in the liver of the dog and the horse, equally as in that of man, and the brain of the latter, which is more complicated, and has more convolutions, is capable of producing more ideas and intelligence, for the organ of these two faculties is more developed. At an epoch when physiology, emboldened by its rapid progress, endeavours to explain the functions of life, by the known properties of matter, it is incumbent on sound philosophy to examine if the instincts, the perceptive and other faculties of animated beings, are in a constant ratio to the different degrees of organization by which they are generated.

But, on reviewing the animal scale, it will soon be evident that life is not an identical phenomenon, and that it does not exist in equal intensity in all beings endowed with it, but in various degrees of perfection, from the most simple animal, up to the most complicated, or man; so that the insensible increase of the faculties, corresponds in all cases to the greater degree of perfection of the corporeal organs. To give an example of this parallel and simultaneous improvement of the organs and their functions, let us trace the important process of digestion; we will first find this function performed in the most simple animals, as the zoophytes, in a sort of bag, having but a single opening, and gradually becoming more and more complicated in the insects, crustaceæ, worms, and molluscæ, till it reaches its utmost degree of perfection in the mammiferous quadrupeds, and man, whose more elevated faculties appear to require nutritive materials in a more elaborated form, and hence better fitted to concur in the production of more perfect organs. It is the same with the other functions, as respiration, circulation, the secretions, &c. All these are very simple at the foot of the scale, but acquire a greater developement and power in proportion as they ascend, producing what physiologists have termed different degrees of organization.

In sensibility, we are presented with another example of this gradation of so interesting a character, as to require notice. In the lowest degrees of the scale, we find the nervous matter distributed throughout the animal; as we ascend, we find it gradually forming small masses of nervous fibre, then nerves, a neurilema, ganglions, a spinal marrow, a cerebellum, and finally, a brain, which, from being of the simplest structure in fishes and reptiles, becomes more complicated in birds and quadrupeds, and finally presents in man the highest degree of perfection of which it is susceptible.

When it is thus proved, that in animals and man, there exists a manifest correspondence between the activity of the faculties and the developement of organs, and that this coincidence is to be found in the whole series of sensible beings, it must be admitted that the study of the inferior animals is capable of shedding much light on that of man—it must be admitted, I again say, that a study of the faculties or internal forces of the former, must afford the greatest aid in explaining the actions of the latter, as these actions are the products of analogous forces, though more restricted and less complicated in animals, and more developed and complete in man.

V.

Principal internal forces which concur in the developement of man and animals, and the actions which they are capable of performing.

If it is impossible to enumerate the actions of man, they may at least be grouped in tolerably distinct orders, according to their nature. Thus, in advancing from the simple to the compound, we discover actions which are the immediate result of the mechanical operations of the organs and tissues of which they are composed; operations which are not under the influence of the will, and may hence be termed automatic. In this class are included the pulsations of the heart and blood-vessels, the peristaltic action of the intestines, and, in a word, all those functions which constitute what is termed vegetable life, or nutrition.

Immediately succeeding to these, is that class of sensations which have been denominated *wants*, and whose seat is principally in the organs of automatic life; as hunger, thirst, the urgency of certain evacuations, respiration, &c. All these internal forces impel us in a more or less imperative manner to enter into relations with external objects. Moreover, another series of influences are connected with these wants, arising from the mode in which they are satisfied, as digestion, secretion, &c., and of which I shall hereafter speak.

The third order is composed of the *instincts;* these are also internal forces, which are unconnected with the reflective faculties, but of which we have a greater or less degree of consciousness, and which impel us to the performance of certain actions necessary to our existence; and although they are executed by the organs of voluntary motion, are at the same time more or less irresistible. They are very numerous, especially in animals, and are generally manifested from within, outwards. They might perhaps be classed in different genera. Some, in fact, belong to organic life, as, for instance, the impulse that urges the scarcely hatched chicken to seek for its appropriate food. Others are intended to protect us from certain injuries, and to enable us to avoid certain accidents. Such is the precipitation with which we retreat from a falling edifice. Others, finally, appear destined to subserve our pleasures.

The *passive* functions of the senses, it appears to me, should form a fourth order, and *active* functions, a fifth. The impression of light on the eyes, of sound on the ears, of cold or heat on the skin, are examples of the former. It is evident, that we have no greater dominion over these impressions, than over the instincts. But the case is widely different, when I place my hand on any object which I wish to feel, when I direct my eyes on anything that attracts my attention, or when I listen with pleasure to certain sounds; it is clear that this series of actions is the result of my will, and that they may compromit my moral responsibility.

After the active functions of the senses, may be placed the acts of *voluntary motion*, as the movements of the legs, arms, &c., by which we transport ourselves from one place to another, provide for all our wants, exercise our trade or profession; in short, by which we act on the external world, and which are the product of muscles under the immediate influence of the brain. It is to be understood, however, that we do not include in this category those movements which occur during sleep, or in a fit of insanity, or in certain diseases, and of which we have no consciousness.

The seventh order includes the *propensities.* These internal forces, which impel us more or less imperatively towards certain objects, or dispose us to view things in a certain manner, have the greatest influence both on man and the inferior animals; they are, however, powerfully modified by the superior faculties, by education, &c., and may be kept in strict subjection in man. In this order I place love, attachment, love of offspring, temper, &c. &c.

In the eighth order I include what Gall terms the *mechanical aptitudes;* as the skill with which the spider weaves the web that is to procure him food, that of the beaver in the construction of his hut, of the oriole in the form of her nest, &c. These kinds of aptitudes appear to me to be separated from the instincts, properly speaking, as they require a degree of intelligence which renders them, especially in man, susceptible of a certain degree of perfection. The bird that for the first time tries the power of its wings, flies awkwardly, and often misses the branch on which it wishes to perch; the old fox is much more adroit and cunning than the cub, &c.

In the ninth order are found all the *intellec-*

tual dispositions, or the faculties of mind. By them we acquire notions and ideas of things, or reflective knowledge. They are susceptible in man of a very high degree of developement. They constitute that peculiar faculty which is denominated *reason*. To these succeed the *moral qualities*, which result from the application of intellectual faculties of a superior order to those which regulate the propensities included in the seventh order.

Finally—not to omit any of the internal forces which might influence the actions of man, the preponderance of certain systems of organs over others, or *temperaments*, must be included, as well as those derangements which occur in the functions of both automatic life, and in that of relation; constituting two additional orders of causes, which are powerful in proportion to the immediate and general influence they exert over the others.

Such are the principal internal causes that concur in the production of our thoughts and actions, and to which may be referred the difference of temper, character, &c., so remarkable in the human race. Without a correct knowledge of each of these causes, and of their influence on our actions, what hope is there of ever arriving at a solution of the great question under consideration? How, in fact, if deprived of these data, can we proceed with any certainty in the education of man, or bestow on him institutions suited to his nature, and which insure his happiness, and a fulfilment of those high destinies to which he is called? Without these data, I repeat, which no hypothesis can replace, are we not continually in danger of chastising children for involuntary offences, of being irritated against an individual who merits our commiseration, in short, of punishing faults whose existence is owing to our own ignorance and prejudices, or of tolerating abuses that ought to be corrected? Without them, how are we to distinguish the essential dispositions of children, and the different aptitudes with which they may be endowed? How are we to avoid the commission of the grossest errors in the education of a young man, by striving to communicate to him talents for which he has not the proper organization, and neglecting the cultivation of those which nature has bestowed upon him? How are we to avoid the serious misfortune of being a source of torment to our family and friends, without being of advantage to them, to ourselves, or to society? Deprived of them, how can any one flatter himself that he could become an equitable parent, a skilful teacher, an enlightened judge, or a profound legislator? Without them, finally, would we be more happy in the choice of our friends, or less exposed to the snares of the vicious?

VI.

Principal external causes which concur in the developement of man, and which exercise a more or less powerful influence over the internal forces, already spoken of.

To the internal and fundamental forces just spoken of, with which man is endowed by his Creator, to subserve his various wants and to preside over his determinations, are added certain external forces, which modify them in a greater or less degree, and which it is of importance should be known. It is therefore necessary to consider these new forces. I will first divide them into primary or *natural*, and into secondary or *circumstantial*, causes; these latter depending on circumstances. Soil, climate, and food, constitute the first, whilst to the second may be referred government, religion, and philosophy.

Soil, climate, and food, says Voltaire, impress characters on man, animals, and plants, that are unchangeable. I cannot now enter into a detail of facts in support of this assertion, which was made by Montesquieu, before Voltaire, and which they both derived from Hippocrates. This influence, although indirect, since it affects the mind through the medium of the body, is not the less prompt and powerful. In fact, who has not observed numberless instances in which food and drink excite or depress us, according to the nature of the soil from whence they were derived, the influence exercised on them by the season, and finally, their mode of preparation; and that these effects, which cannot be denied, when permanent, produce particular diatheses, which may be common to all individuals residing in the same district or country. Gall goes much further, and pretends that even the milk of our nurse, although in itself incapable of adding any additional faculty to those with which we are endowed by nature, may, nevertheless, sensibly alter the texture of our organs, and thus modify the developement of our primitive dispositions. He thinks that soil and climate are not only capable of changing the constitution, but may also alter, to a considerable extent, the developement and form of portions of the brain, and thus modify in a determinate and durable manner, the intellectual and moral attributes of individuals. No one now denies the changes produced by long continued customs and usages. All authors admit that the idiocy and deformity so remarkable among the inhabitants of some countries, as the Cretins, Albinos, &c., are the result of the permanent influence of certain local causes peculiar to these countries. Let us now pass to another division of these causes.

The same authors affirm that they also produce, in time, strong evidences of their action, which are less durable and unalterable than those above alluded to, because, from their very nature, they are liable to experience modifications which militate against their permanency. They, however, act in an immediate manner on the intellectual and moral qualities, and hence produce astonishing effects. From the earliest ages, history presents mankind as under the influence of two very different, and often opposite systems of ideas, and advancing with various degrees of success towards a common goal. One based on reason, is supported by experience and the observation of visible objects. The other, founded on revelation, is occupied with what is supernatural and ideal. The first, which has received the name of philosophy, is occupied with the study of nature, and admits nothing that is not appreciable by our faculties. The second, on which is founded all the doctrines of religion, is devoted to incomprehensible beings, whose attributes can never be fully appreciated by the limited powers of our mind. The former, that is, philosophy, owes its origin to the sages of Greece, and more especially to Plato and Aristotle, and endeavours to explain everything by mere reasoning. The latter is derived from ancient traditions, and includes all religions, from the pantheism of the heroic ages, to the purer doctrines of the present day. According to philosophy, reason is the first authority we are to consult, not only as respects nature and man, but also as regards the Deity, allowing to authority and tradition only a secondary rank. According to religion, we are to rest on the evidence of things unseen. There is not a shadow of doubt of its vast importance to the welfare of the human race, but unfortunately, it has been so corrupted by the evil passions of man, that it has lost much of its sublimity and inherent holiness.

Such is the character of the two secondary causes that have had the most influence on the destinies of mankind. For a long time united and directed by a single head, they gave rise to the theocratic and patriarchal government of the first human communities. But, the successive developement of ideas, and the improvement of institutions, finally separated doctrines apparently so opposed to each other; they then became rivals, and a third power arose, and society became subject to three influences; reason, the laws, and revelation; or, in other words, philosophy, civil government, and religion. But, these three powers, although seeking the same end, are far from having pursued the same means of attaining them, and have not always maintained a salutary equilibrium. In almost all cases, civil government, less enlightened than its two rivals, has been subjected to the influence of one or the other, and has been made an instrument to subserve their purposes. It has rarely been enabled to pursue a middle course, and, too often, has become united to one of these powers, for the purpose of crushing the other. In general, nations have been most happy, and political convulsions least frequent, when these three causes have enjoyed an equal influence.

VII.

General view of the forces which act on man, and reflections on the nature of the progress of the human mind, and the state of civilization we have attained.

If the reader makes a systematic analysis of the various topics I have presented in the last section, he will find that the view I have taken, is far from being as perfect as might be desired, and I must therefore beg that he will regard it merely as an essay susceptible of much improvement, but which can take place only when further researches shall have furnished more precise data on the objects under consideration. It would therefore be superfluous to enter into long details respecting the motives that determined me to give it in its present form. I will restrict myself to some reflections calculated to remove difficulties, and to justify certain assertions.

If I am not greatly mistaken, it possesses this advantage over all the metaphysical classifications hitherto devised, as the categories of Aristotle, Kant, and even of Locke, in its presenting real objects as the evident and proximate cause of all our actions, and not fanciful divisions of abstract ideas, which have no existence except in the caprice of those who promulgated them. In fact, the automatic movements, wants, instincts, and other faculties, as I have described them, are forces inherent to human nature, and are subject to no changes that do not first operate on it. They have nothing that is arbitrary or speculative; they may be understood at a glance, whilst it is impossible to comprehend the pure conceptions, the innate ideas, the forms of sensibility, and other subtilties of Aristotle and Kant. All the causes admitted in this sketch, really concur in the production of our actions, and have certain limits, which are, in most cases, in exact proportion to the exigencies of the case; thus, Gall admits five modes of action for most of the forces he describes, and which gradually become increased from their lowest limit, till they reach the maximum of intensity they are capable of acquiring; he divides physical love, for instance, into the negative, moderate, and ordinary states; desire, and finally, passion.

It may, moreover, be established, that in all cases where these forces are the product of a single organ, their intensity is always in proportion to the developement of this organ, and that those which result from the combined efforts of many organs, are in a direct ratio to those organs which tend to produce a positive effect, and in an inverse ratio to those which act in an opposite manner; and that the resulting action is powerful in proportion to the predominance of the former. Moreover, as the question here relates to geometrical ratio, in which the terms never descend to zero, so in every animal where there is a cerebral influence, none of the organs subjected to this influence, are absolutely independent of the will, permitting the animal to suspend, for a time, the fulfilment of their purposes, even when they belong to the system of organic life.

I will here insert an observation which will throw some light on what will hereafter be said on liberty. According to Gall, the brain presents no point that can be regarded as the sole centre of all the faculties of man. Gall always ridiculed one of his pupils, who wished to demonstrate an organ of self, (*moi*) which he pretended that he had discovered. The unity of the power which constitutes despotism in human communities, and which would be necessary to establish a boundless power, as is feared by the partisans of absolute freedom, does not exist. The legislative power of man results from the simultaneous action of all the organs which concur in the production of his disposition. Each force and faculty always acts in the plenitude of its activity. It may be balanced or overpowered by the action of others, but is never destroyed. This doctrine is not more contrary to a free will, than a parliament to the royal prerogative; metaphysicians have erected this faculty into a special being, which has its consciousness, its judgment, its will, &c.; it is in reality nothing more than the result of the changes which have taken place in certain forces. According to Spurzheim, the lower propensities act in man as in animals. If they are more delicate and moral in him, it is not because they are less imperious, but because the superior faculties soften their violence and brutality.

I will terminate this section with some reflections on circumstantial, secondary causes. It might be supposed, from what I have said, that I regard civil government as a power subordinate, and of later origin than the two others; but this is not the case. All three must necessarily have arisen about the same time, but in their successive developement, they have not advanced with equal steps. There have been epochs when civil government had more power than religion, and others when it had much less. They are both alike in prescribing duties and rules of conduct, and in employing praise and censure; but whilst the one is supported by a physical power that is obvious to all, and instantly punishes any infraction of its precepts, the other is founded on a moral force, subject to great vicissitudes, and defers the execution of its rewards and punishments to a distant period. Such, it appears to me, is the cause of this alternate predominance. Moreover, both testify but little deference to reason; this power it is considered should be silent at the command of the one, and reverentially bow to the mysteries of the other. Philosophy, on the contrary, looks upon this faculty as the most sublime of man's attributes, and as the supreme and immediate regulator of all his actions. She considers reason as the principle on which she establishes her empire, and as the means of exciting man to noble and generous actions, without any other reward than self-approbation, and of defending him from vice, without any other punishment than remorse. Always elevated in her thoughts, and sublime in her views, she insists that man should devote himself to the furtherance of the happiness of his kind, and all his actions should be free, generous, and disinterested, but founded on the purest principles of virtue.

With these views, I admit three kinds, or epochs of civilization. In the first, men having united in communities for some time, at first occupy themselves with those faculties of mind whose culture is easy, and with such objects as neither require experience, or a high degree of developement in the mechanic arts. This is the epoch of literature, of the arts of imitation, and of all that appertains to the imagination, and depends on taste; as painting, sculpture, architecture, the first rudiments of geometry, and some erroneous ideas on natural history. Such was civilization among the Greeks and Romans.

The second epoch supposes a more developed reason, and a greater maturity of genius. More profound researches in literature, ethics, and philosophy, induce a greater developement of the natural sciences. Physics, chemistry, anatomy, physiology, &c., are greatly improved, and acquire more precision and importance. Geometry, mechanics, and navigation, become the instruments of the deepest research, and afford a thousand resources to man, which could scarcely have been hoped for. Finally—the social relations, agriculture, commerce, and industry, are affected by the general impulse, and assume a more elevated character, and thus complete all those elements of prosperity which characterize this second epoch of civilization, which is now enjoyed by most of the governments of Europe, the United States, &c.

After having paused for a moment to contemplate this scientific wealth, man soon begins to apply them to new wants, and to endeavour to perfect what he discerns to be defective. He has ascertained that his acquisitions have increased his power in a tenfold degree, and, struck by the imperfections of existing institutions, which are apparent to a judgment strengthened by the culture of the exact sciences, he endeavours to base them on more reasonable motives. Political economy and legislation now gradually assume the rank of true sciences; free discussions replace a restricted expression of opinion; prejudices insensibly disappear; the law offers a guarantee against arbitrary acts; religion and public morals become free from the fetters that now embarrass them; overgrown fortunes disappear with the privileged classes, and all ranks of society acquire such instruction as enobles them, and renders the practice of virtue easy and general; man, in short, becomes what he ought to be, a free, generous, and reasonable being. This is the reign of philosophy. May we attain this happy period, of which history, as yet, affords no example.

CRANIOSCOPY.

PART FIRST.

PRELIMINARY OBSERVATIONS.

I.

Object of cranioscopy.—Its extent.—Its limits and connexions with other sciences.

Dr. Gall is, as is well known, the author of a system on the functions of the brain, and the faculties of man. In endeavouring to render a knowledge of this system more general, I have employed the common term *cranioscopy*, *or cranoscopy;* by which it is so often designated, and which is, in some degree, consecrated by use; but to correct the erroneous idea it gives of the discoveries of this celebrated man, by presenting them as appertaining to a science of mystery and divination, it becomes necessary for me to state the objects of this science, and to enter into some details on the signification of the various appellations it has received.

Cranioscopy, or cranoscopy, which some also term *cephalology*, (from χεφαλή, brain,) and for which I prefer the denomination *cranognomony*; that is: knowledge of the laws of the cranium, is, like all the other natural sciences, founded on facts verified by observation, and connected together by a chain of reasoning which renders them readily understood. This science, which Dr. Gall has often spoken of, under the name of *organology*, or *craniology*, from its taking cognizance of the organs, or parts of the cranium and brain, which are the seat of the faculties in man and animals; when considered in its fullest extent, endeavours to explain, by the organs, the manifestations of the primary or fundamental forces of sensible and locomotive living beings. Our intention is, to restrict it more particularly to the study of man, and not to speak of that of animals, except to elucidate difficulties, or to give a more authentic and universal character to certain truths.

These few words are sufficient, if I am not greatly mistaken, to show that cranioscopy is intimately united with all the natural sciences, and consequently, like them, having more or less immediate relations with our wants, and our civil, moral, and religious institutions. Its connexion with natural history, is evident; its object in common with that science, is the study of created beings; but less as respects their form and classification, than their faculties and wants. Its relations with physics and chemistry, although not so intimate, are fully substantiated. It is impossible, at the present day, to pretend to any knowledge of the nature of bodies and their properties, without a previous acquaintance with the elements of these two sciences, and an insight into the principal laws of nature, of which they may be considered to be the key; they have become still more indispensable, since physiology has been enabled to explain the principal functions of living bodies, by the simple properties of their tissues, by their hygrometric qualities, and by the elective affinities of chemistry. The different divisions of medical science, have also many points of inosculation with craniology. Pathology, for instance, daily furnishes facts of the highest importance, on the functions of the cerebral organs, and with which the cranioscopist must become acquainted. Finally—anatomy and philosophy have become more and more indispensable to the philosopher, and to the proper cultivation of the exact sciences, more especially to that of craniology, to suppl [illegible] anatomy

which is wholly based upon them. The craniologist cannot neglect them, without compromising the justness of his views, and the truth of his opinions.

But, besides the connexion of craniology with the sciences to which I have just alluded, and the advantages it derives from them, it, in turn, influences them in no slight degree, and furnishes the most important light to medicine, in its application to mental diseases. Moreover, it has enriched moral and intellectual philosophy; that is, psychology, ideology, education, and jurisprudence, with truths that can never be overlooked.

II.

Opinions entertained by the learned, on the mind, understanding, and seat of the faculties, at the epoch when Gall promulgated the principal results of his researches.

To fully appreciate the discoveries of Gall, it becomes necessary to notice the state of science previous to the announcement of his discoveries. Those philosophers who have made the closest study of man, have differed widely as to the principle and cause of his actions. They have been greatly at variance as to the number of faculties which they regarded as fundamental, and in the explanations which they have given of these faculties.

None of the sages of antiquity, until the time of Plato, appear to have had any definite ideas on the nature of the mind. This inexplicable essence was regarded as both the principle of life, and the source of all our faculties. It was a kind of entity, which was denominated *pneuma*, by some, and *psyche*, by others, but which was considered by all as an exceedingly subtle substance, and embued with very elevated metaphysical properties. Plato, who was endowed with a highly poetic imagination, has spoken so mysteriously of it, that it is not known even yet, whether he considered it as partly material, or as a peculiar and purely spiritual being, that is wholly destitute of all the properties of matter.

Aristotle, the most celebrated of the disciples of Plato, in adopting the ideas of his master on the nature of the mind, at the same time thought that it had some faculties in common with animals, and others which were inherent and exclusive.

The fathers of the church, in assuming the spirituality of the mind, also regarded it as an immediate emanation from the Deity, and consequently immutable in nature, and eternal in principle. From this time, the belief that this mysterious being was an immaterial and immortal substance, endowed with the faculties of knowledge and will, became dominant. Man was regarded as the great end of creation, and as the only being capable of discernment, and of free will. Animals were considered as complete machines, incapable of self-action, and regulated by an immutable destiny. These ideas have existed for near two thousand years, among the most civilized nations of the world, though some philosophers have persisted in attributing the qualities of living beings to certain arrangements and combinations of matter.

Bacon, one of the most illustrious of those sages, who presided over the revival of letters in Europe, came to the conclusion that there were two minds, the one sensitive, and the principle of sensibility and voluntary motion; the other reasonable, giving rise to reason, imagination, memory, &c.

Descartes, the most celebrated of the philosophers who immediately succeeded to Bacon, without explicitly admitting or rejecting the existence of two essences, admits that man is endowed with a mind having four faculties; sensibility, imagination, understanding, and will, but considers animals as mere machines.

Locke, whose rigid and methodical reasoning exercised so powerful an influence during the 18th century, reduced the mind to two faculties, understanding, and will; thus differing little from the opinion previously promulgated by Hobbes, that this substance was endowed with the faculties of knowing and willing.

Condillac, the most remarkable of the disciples of Locke, reduced all the faculties of mind to sensation, and considered attention, comparison, judgment, reflection, imagination, and reasoning, as altered sensations.

Finally—Bonnet, celebrated for his profound researches in natural history, and metaphysics, added to the faculties admitted by Locke, thought, free will, and action, and was of opinion that animals had an immortal soul.

All these systems on the faculties of the mind, may be traced to Aristotle, and are founded on the principle admitted by him, that all our ideas are derived through the medium of the senses. All admit, as has been explained by Romiguiere, the action of an object on the senses, that of the senses on the brain, and of the brain on the mind. But some metaphysicians, at the head of whom must be placed Leibnitz, Poshaska, and Cabanis, having discovered a series of conscious perceptions in the understanding, which were not derived through the medium of the senses, pointed out the error of the Macedonian philosopher, and admitted *instinctive tendencies*, by which man and animals are impelled to certain acts. Gall, as will be seen, has gone much further, and asserts that the external world is only known to us from the fact of the existence of certain fundamental forces, fitted not only to perceive and judge of impressions made on the senses, but which are also the source of a multitude of internal emotions, which have the greatest influence over our actions. They impress a special character on every individual, by which he may be distinguished from all others of his species.

Finally, two new systems of philosophy, which have recently arisen, one in Germany, and the other in Scotland, have made many proselytes, and dispute the empire of public opinion. The first of these, known under the name of *Kantism*, from the name of its author, Kant, is based on pure conceptions of mind, innate ideas and entities analogous to the categories of Aristotle. The second, which is termed the Scottish philosophy, or *electism*, as denominated by those who profess it, is made up of principles derived from the most celebrated spiritualists, from Plato, to Descartes and Leibnitz.

If we review the various opinions on the seat of the mind, they will be found still more dissimilar than those on its attributes. Pythagoras, Hippocrates, Plato, and Galen, placed it in the brain. Aristotle, and the stoics, in the heart; Descartes, in the pineal gland; Lapeyronnie, in the corpus callosum, &c. Others, having remarked that all these parts may be diseased or destroyed, without any alteration being perceptible in the faculties of the mind, have denied that they are its seat, and have consequently placed it in the whole body. Dumas endeavours to sustain this opinion, by observing, that as the brain is insensible, it cannot be the seat of sensibility. Stahl, and his disciples, thought that the substance of the mind (ενορυων, of Hippocrates,) was expanded over all the nerves, thus making this divine emanation a kind of cerebro-spinal fluid, after the manner of Majendie. Finally, a fourth class of philosophers, taking the immateriality of the mind as the basis of their reasoning, have considered it highly contradictory to assign any particular seat to it, and have abstained from pronouncing on this truly inexplicable subject. Philosophers, moreover, have not agreed better on the union of these two substances; some have had recourse to a plastic medium, others to very subtile emanations, and Malebranche has come to the conclusion, that the Deity himself presides over all our actions, thus making the divinity a sort of subaltern agent, subject to the orders of each individual.

This short sketch of the differences of the opinions of philosophers, as regards the mind, its attributes, and seat, fully demonstrates the inutility of attempting to solve these questions, and the necessity for restricting ourselves to those material conditions connected with the manifestation of our faculties.

III.

Erroneous opinions on the brain and nervous system, entertained by physiologists and philosophers, before the time of Gall.

Until the time of Gall, anatomists dissected the brain by slicing it in all directions, not with the intention of arriving at a knowledge of the materials of which it is composed, but merely to ascertain the peculiarities and conformation of the different parts thus exposed, without paying the slightest attention to the tissue itself, or to the nature and direction of the fasciculi of fibres of which it is composed. The most skilful, from Varolius and Vieussens, to Bichat and Vic d'Azir, blindly followed this method, and this latter strongly recommends it as the only one capable of leading to a true knowledge of the form of the parts, conclusively showing that this was the only object of anatomists. The celebrated Francke, observed to Gall himself, that it was a ridiculous presumption to entertain any hopes of finding anything new in the brain; at the same time, this mode of dissection was a natural consequence of the false ideas entertained respecting this most important organ. At that time, and for a long time previous, the most prevalent opinion was, that the brain was an almost inorganic mass, a sort of pulp, or peculiar parenchyma, composed of four substances, distinguishable by their colour; and of different parts of which the functions were not even suspected. The absurd and ridiculous names by which these parts were, and indeed still are, designated, afford irrefragable proofs of the complete ignorance that existed as to the nature and functions of this organ. But, says Gall, this ignorance is not astonishing; instead of paying attention to natural phenomena, physiologists involved themselves in metaphysical disputes, and endless speculations on the seat of the mind; they dissected caterpillars and mites, but neglected the anatomy of the brain.

As to the nerves, says Dr. Demangeon, one of the most zealous disciples of Gall, they were universally regarded as arising from the brain. It was thought, that nature had (if we may be allowed the expression,) spun them from this organ, without its ever having perceived how contradictory it was that very large nerves should, in some cases, be spun from a small distaff, and *vice versa.* Thus, the large spinal marrow, and voluminous nerves of quadrupeds, were considered to be furnished from their relatively small brain, whilst at the same time it was evident that in man, in whom the brain is very large, that these parts were comparatively small, and that in the acephalous animals, there was no brain for them to be derived from.

On reviewing the doctrines antecedent to that of Gall, it will be found that Hippocrates, regarded the brain as a sponge, which imbibed the moisture of the body. Aristotle, on the contrary, viewed it as a humid mass, intended to temper the heat of the body. Bichat, thought that it was merely an envelope for the protection of the parts situated at its base; others, again, asserted that it was an organ of secretion. Some contended that it was merely the common origin of the nerves, whilst some again were of opinion that it was the organ of sensation and ideas.

Finally—Buffon affirmed, that there was no perceptible difference between the brain of a man, and that of an ape; and others went so far as to sustain the perfect identity of this viscus in all animals.

If from the brain, we pass to the reigning opinions as to the seat of most of our faculties, propensities, and instincts, at the epoch when Gall began to teach his new doctrine, we will find the same contradictions, and the same errors; because Aristotle had asserted that the heart was the seat of the soul; the blood was regarded by many, as the channel by which the mind received the impressions of external objects. Richerand, like Galen, taught that the heart was the organ of courage and energy, whilst some asserted that it was the seat of love and the sympathies, or of cruelty, and the passions; though others, again, located these latter in the abdomen, the hypochondria, the solar plexus, or the stomach. Even St. Matthew says, that out of the heart proceed evil thoughts, murders, adultery, thefts, &c. The liver has been looked upon as the seat of anger by some, and of sensuality, by others. The temperaments are still considered, by many, as the sole cause of the differences of character and disposition in man. Bichat entertained the opinion that folly and imbecility of mind, were owing to a want of symmetry between the hemispheres of the brain, and thought that considerable portions of the upper convolutions might be removed, without altering the intellectual faculties. Buffon and Bonnet, pretended that a single organ might be so skilfully constructed as to be the source of the most diversified faculties, and regarded the hand of man, the trunk of the elephant, the tail of the beaver, &c., as the cause of their superiority over other animals. Cabanis, Bichat, Broussais, and many other distinguished physiologists, whilst recognizing the brain as the organ of consciousness of our propensities, attribute the origin of these to the organs of vegetative life. Esquirol and Pinel, consider a deranged condition of the splanchnic viscera, as the cause of mania, insanity, and idiocy. Foderé asserts that it is the blood, &c.

Thus, instead of having gone at once to the common centre of our faculties, philosophers of greatest eminence, have been contented to traverse the circumference, and have fallen from one error into another. In the elephant, the cause of his intelligence resided in his trunk ; in the beaver, in his tail. Some naturalists revived the opinion of Anaxagoras, that the hand of man was the principal cause of the superiority of his faculties over those of animals, and especially the monkey tribe; and Vic d'Azir, explained this superiority on the difference of the muscles, making human reason to depend on the power of flexing the fingers, and of opposing the thumb to each of them. Another class of philosophers, attributed this superiority to the delicacy and perfection of his senses. Buffon maintained that the touch was the only sense which furnished us with full and complete ideas of things, and that it was endowed with the power of regulating all the rest.

IV.

Historical view of the labours and discoveries of Gall, and the progress of his ideas on cranioscopy.

The obstacles with which Dr. Gall had to contend in the establishment of his doctrine, as well as the prejudices with which he himself was embued, and which he was obliged to overcome before he could give a free scope to his ideas, can now be appreciated. The latter obstacle, says he, was by no means the least formidable to be surmounted. A remarkable circumstance attending the progress of his researches, was, that he has gone from the known to the unknown, and that he has been indebted in no degree to chance. A knowledge of the functions, has preceded that of the parts of which they are the seat. He never attempted to designate the organ of a faculty, until he had observed this faculty in several individuals. Two distinct peculiarities of mind had been the source of all his discoveries—a decided taste for the study of nature, and the habit of reflecting on what passed around, to discover the causes. During his youthful days, he took much pleasure in natural history, especially in that of birds. Even before he went to college, he had remarked that his brothers, sisters, and comrades, were each distinguished by some peculiarity, or some aptitude or propensity, which served to characterize them. He observed, he says, that one was modest, another haughty; this one frank and open, that deceitful; this one peaceable, that quarrelsome. A fourth excelled in writing, whilst another had a decided talent for numbers. One was the carpenter of the house, and was always seen with tools in his hand; and the greatest pleasure of another, on the contrary, was to assist at the service of the mass, and to ring the church bells, &c.

During the course of his studies, he perceived that such of his companions as were most distinguished at the public examinations, were characterized by the excellence of their memory, and in all cases had very prominent eyes. The coincidence of these two circumstances, so well calculated to strike a mind like his, was not lost upon him. He soon came to the conclusion that it could not be the effect of chance, and after reflecting maturely upon it, he came to the conclusion, that if memory was always announced by large, prominent eyes, that our other faculties must be connected with other external conformations. "From this moment," says he, "every individual distinguished for any peculiar quality or propensity, became the object of his attention, and of a close study of their heads." Great musicians, great painters, great poets, great mathematicians, &c., were successively the objects of his investigations. Finally, he indulged the hope of one day being able to establish a new and true physiology of the brain, Such was the state of Gall's opinions, when the occurrence of a pathological phenomenon afforded him well grounded hopes of perfecting his system. Physicians, generally considered that the disease termed hydrocephalus, or dropsy in the head, resulted in a solution and destruction of the substance of the brain; an organ which was, at the same time, regarded by philosophers as the seat of the mind. Gall, not being able to reconcile these two ideas with what he had himself observed—that this affection was not always attended with a loss of the intellectual faculties, was convinced that either philosophers or physicians were in error, and strove to verify the fact.

A hydrocephalic female under his care, and who bequeathed her head to him, enabled him to test the validity of his doubts, and to demonstrate that the white portion of the brain is of a fibrous texture, and not a mere conglomeration of globules, as had been supposed. In the head of this woman, who had preserved the entire use of her faculties during her illness, about four pounds of water were found, and the kind of maceration which the brain had undergone, permitted Gall to affect an unravelment of the convolutions, and also to demonstrate the fibrous texture of its parenchyma, to his pupils. From this moment, Gall advanced with redoubled vigour on his new route, and in a short time he was enabled to collect a sufficient number of facts, to guarantee the truth of his doctrine.

PART SECOND.

GENERAL CONSIDERATIONS ON CRANIOLOGY, AND THE INTELLECTUAL AND MORAL PHYSIOLOGY OF MAN.

I.

Physiological and primary principles on which craniology, or physiology of the brain, is based.

After having proved that the senses, the sensations, the wants, attention, pleasure, pain, the desires, the passions, climate, and social relations, cannot give rise to any instinct, propensity, sentiment, or talent, or to any mechanical, intellectual, or moral aptitude; that education is capable of perfecting or deteriorating, repressing or directing those faculties which both man and animals have received from nature, but that it has not the power of either destroying those which they have, or of imparting any with which they have not, been naturally endowed; Gall remarks, in the first place, that all animals, immediately after birth, perform certain complicated actions, without any previous instruction, and before they can possibly appreciate the result of these actions; that, for example, the spider just escaped from the egg, begins to weave a web; the ant-lion, to construct his treacherous trap; the chicken, to run after insects and worms; the tortoise, to seek the nearest pond, dragging with him the remains of the egg that contained him; that the young puppy, the kitten, the calf, the lamb, and the colt, are scarcely ushered into the world, before they search for the teat from which they are to derive their nourishment; that the infant presses the breast of its nurse with its feeble hand, to force out the milk it contains; that it cannot be to any previous education received from its mother, that the mason wasp owes the skill with which it constructs its nest; that birds have received no instructions either on the manner of constructing their nests, on the materials to be employed, or on the route to be pursued in their migrations; that it is not to the instructions of its parents, that the cub fox is indebted for the skill and address he displays in pursuit of his prey, &c.

In the second place, that his brothers, sisters, and comrades, although they had all received the same education, had grown up under the influence of the same circumstances, and had been, as it were, nourished with analogous impressions, were far from having acquired the same sum of knowledge, or of having attained the same maturity of intellect; that among those whose education had been the most carefully attended to, some, notwithstanding their best and most strenuous exertions, were far surpassed by others in the number and depth of their acquirements; that some never attained even mediocrity, whilst others, almost without effort, had met with the greatest success.

Finally, observing that animals, both in a wild and domesticated state, presented differences in their faculties and manners, analogous to those remarked in the human race; and that, not being able to attribute the cause of these differences either to education or unwillingness, or to the impressions made by external objects on the senses, he thought himself authorized to *conclude that the propensities and faculties of man and animals, are innate.* Such is one of the primordial ideas of Gall, and such are the considerations that led him to adopt it as the first of the four principles which serve as the foundation of his doctrine.

Gall, afterwards observing that the aptitudes, and the intellectual and moral qualities, differ in all animals, as in man, according to the constitution, the sex, and a number of material circumstances, which it is impossible to overlook; that they undergo the greatest changes in infancy, youth, manhood, and old age; that they even differ according to the quantity and quality of the food, or the ease or difficulty of digestion; that sleep, intoxication, disease, especially apoplexy, acute fevers, effusions, tumours, inflammations, and ulcers of the brain and its membranes, derangements in the functions of the liver, the stomach, and other gastric organs, are all causes which debilitate, repress, increase, or alter the intellectual functions in a thousand different ways; adopted as the second principle of his doctrine, *that the exercise of our instincts, our propensities, our intellectual faculties, and our moral qualities, whatever may be the principle from which they are derived, is subject to the influence of material and organic conditions.*

Continuing, with the same perseverance and sagacity, his strict examination of the functions attached to different organs, Gall proved that no one of the organs of internal life, as the heart, stomach, lungs, liver, diaphragm, intestines, kidneys, the plexuses, ganglions, great sympathetic nerves, &c., could be either the cause or seat of any affection, instinct, aptitude, intellectual faculty, or moral quality; that no part of the organs of sense, or of voluntary motion, as the eyes, ears, mouth, nose, cheeks, hands, fingers, reproductive organs, &c., could, in like manner, be the source of any instinctive, intellectual, or moral faculty; and also that these forces cannot be attributed to the whole organization, or to the temperaments, since each one of all these parts has its peculiar and well known functions, and which are of a contradictory nature with those under consideration. Collecting together, moreover, numerous facts in human and comparative anatomy, physiology, and pathology, which demonstrated that a greater developement of the cerebral organs aids and augments the intellectual and moral functions, and causes a more energetic manifestation of the properties of other organs, he concluded, and admitted as the third principle of his doctrine, *that the brain is the organ of all our instincts, propensities, sentiments, aptitudes, intellectual faculties, and moral qualities.* But, instead of stopping, like his predecessors, at this acknowledged truth, he pushed his observations to a greater length, and maintains that it is proved: *that each of our instincts, propensities, sentiments, talents, intellectual and moral faculties, has a portion of the brain which is specially appropriated to it; a determinate seat, and that the developement of these different parts, which form so many small* *brains, or particular organs, is manifested on the external surface of the cranium, by visible and palpable signs or protuberances, so that, by the examination of these protuberances, or cranioscopic elevations, the dispositions, and intellectual and moral qualities peculiar to every individual may be ascertained.* But, it must be admitted, that this fourth and last fundamental principle of Gall's doctrines has met the most opposition and incredulity. Nevertheless, convinced of the importance of his labours, and of the happy influence they must exert on our institutions, and on the treatment of cerebral diseases; moreover, satisfied of the purity of his intentions, and strengthened by the numerous facts that he had collected in favour of this principle, he did not hesitate to regard it as one of the essential bases of his new doctrine; which, according to him, is the only one that explains, in a satisfactory manner, the whole of the intellectual and moral phenomena of man, during the various stages of his existence. Eminently fruitful in its applications to human affairs, it is above all, says he, of the highest importance to education, the arts and sciences, the study of history, of morals, of medicine, and of legislation.

The above may be considered as an historical sketch of the fundamental principles of the system of Dr. Gall. It is now incumbent on us to explain the essential peculiarities and means on which he was enabled to found a doctrine that has attained such celebrity.

II.

Conditions essential to the manifestation of the intellectual and affective faculties of the mind, and the formation of thought.

To confine the study of man to an observation of facts, and to found a system of true philosophy on the whole of his faculties, it is of importance to ascertain whether these latter can be manifested without the intervention of certain organs with which they appear to enjoy intimate relations, or whether their manifestation is necessarily subjected to observable material conditions. To answer this question, Gall observes, that our faculties, like those of animals, augment or diminish in proportion as the organs in which he supposes them to be seated are developed, strengthened, or weakened; that they are most active and vigorous, when these same organs are most energetic and perfect; and that, in short, they present aberrations or derangements in their manifestations, perfectly analogous to those to be remarked in their organs. Let us examine this in detail: if we trace man from his cradle to his grave, we first see him, feeble, incapable of performing the simplest action, and only manifesting his existence by irregular movements, and the desire for food. Soon, however, he becomes sensible to the impressions of surrounding objects, experiences faint emotions of pleasure and pain, desires and aversions; testifies various inclinations; manifests aptitudes, talents, love, ambition, and, successively, all the other intellectual and moral forces with which he is endowed, become developed; and, finally, acquire a maximum of energy, which they preserve for some time, but which afterwards decreases, till these faculties insensibly lose all their activity, and are finally totally destroyed; in some cases, long before death.

But this gradual progress of our instincts, aptitudes, intellectual faculties, and moral qualities, corresponds in the most constant and perfect manner with the developement and the decay of the cerebral organs. In fact, we see this viscus, in the first instance, almost fluid, gradually acquiring more consistence, assuming a fibrous structure, and insensibly increasing in size till about the fortieth or forty-fifth year of the age, when it appears to have gained its full developement, remaining stationary in this perfect state for some time, then gradually becoming diminished in its convolutions, insensibly losing its volume and elasticity, in exact ratio to the diminution in the intensity and vigour of the faculties of which it is the seat. It is, moreover, a fact which Gall has verified by a great number of observations, that all men who are distinguished by their energetic faculties, or eminent talents, have the forehead, or some other part of the head, much developed; whilst all those, in whom the cranium is small and contracted in its dimensions, are equally deficient in intellectual and moral faculties. Gall saw a young man, in whom the forehead was scarcely an inch in height above the root of the nose, who manifested those faculties only, the seat of which is near the eyes; and was incapable of exercising any of those which appertain to the organs which are situated in the upper region of the forehead; that is, of comparison, causality, &c., being in fact a kind of idiot, who could be employed in no business requiring an exercise of the reflective faculties. On the contrary, he observes, that in rickets, the usual effect of which is to produce considerable irritation and developement of the brain, the intellectual faculties of children are frequently more vigorous and expanded than comports with their age. It is therefore certain that our faculties are enlarged in proportion to the greater developement and perfection of the structure and organization of the brain, and they are diminished in an exact ratio to the deterioration or deficiency of this organization, whence it evidently follows that their manifestation depends on this organ.

Gall also observes, that if in infancy the faculty of reflection is deficient, owing to the weakness of the brain, this is still capable of perceiving a simple sensation, of experiencing certain desires, and feeling certain wants; in short, of gradually acquiring the necessary powers. The want of reflection in an infant, however, is not exactly on account of the weakness of its brain, but because the exercise of thought requires a certain number of materials, which he has not as yet acquired. Another proof that the convolutions of the brain are the material organs of the faculties of the mind, is, that we find that they increase in size, in proportion to the manifestation of these faculties, and that the developement of each is independent of that of all the others; that wherever a similar developement of these parts is found, similar aptitudes and qualities are to be recognized; that wherever the developements differ, the qualities of mind also differ. Moreover, as the stomach, for instance, is not always in action, so our propensities are not permanent. The nightingale sings only in the spring; the linnet and swallow migrate in the autumn, &c. It may readily be supposed, for reasons which will occur to every one, that these same propensities may sometimes acquire an astonishing energy, always attributable to an increased action in the convolutions of the brain, in which they are seated; thus, some men fall into a brutal sensuality that is revolting, and others into a despair, that refuses all consolation. Finally—how can the succession of certain intellectual faculties, certain moral qualities, and certain vices which descend in families, be explained, except by this doctrine? A multitude of corroborating circumstances, therefore, tend to prove that the convolutions of the brain are the seat of our instincts, and our intellectual and moral qualities, as well as the instruments of their manifestation.

III.

Intellectual and moral nature of man, and how far he is endowed with freedom of will.

Dr. Gall, having been accused of materialism, and of having denied the existence of free will, undertook the defence of his doctrine from these charges. The researches he made with this intention, do not constitute the least curious part of his work. He has more especially availed himself of the writings of the fathers of the church, and of those of the Platonists, and the result of his inquiries has shown, that his opinions were similar to those of the most celebrated and erudite of these sages. His replies to the first accusation appear to me to be triumphant, and may be reduced to the following: you accuse me, says he, of materialism, when I have declared that I have attempted nothing beyond physiological inquiries, without even entering into the controversies of the psychologists, respecting the nature and properties of the soul, of the existence of which I do not entertain a doubt. You accuse me of materialism, because I teach that our intellectual and moral dispositions are innate, and that their exercise depends on material organs in the brain. But, this opinion is precisely what you yourselves profess, (since you admit, with all the world, that the brain is the seat of the mind,) and which has also been held, during all ages, by those best fitted to judge. Solomon, St. Paul, St. Augustin, and most philosophers, have openly declared that the mind is regulated by the condition of the body, that its faculties depend on organization and health, and that well constituted corporeal organs are always accompanied with the highest intellectual faculties. All physicians, from the time of Hippocrates, have also referred our thoughts, desires, passions, dispositions, and moral character, to corporeal conditions; some to the organs of automatic life, others to certain ganglions, or plexuses of nerves. Hence, says he, to accuse me of materialism, is to include all the fathers of the church, all philosophers, and all physicians, in the same category.

Finally—you pretend that I am a materialist, because you confound the principles of our faculties with the corporeal organs, which are but its instruments; but in this you have committed the grossest error; in fact, it is precisely as if you should maintain that the organ of sight, and the faculty of seeing, are one and the same thing. Such an error is the more unpardonable, from its having been so often pointed out, and more especially by St. Thomas, and St. Gregory of Nyssa. This latter, in comparing the human body to an instrument of music, observes, that, "as many very eminent musicians are often unable to give proofs of their talent, from the badness of their instruments; so, in like manner, the mind cannot exercise its functions, when the corporeal organs are in a deranged state."

The plurality of organs, described by Gall as existing in the brain, ought not to give rise to an imputation of materialism, for the fingers are not more material than the hand; and those who admit the whole brain as the organ of the mind, are as much materialists as those who attribute each of its faculties to a particular organ. But this plurality of organs, it is said, destroys the unity of consciousness. This reasoning is fallacious, as it is sufficient to have seen a brain, to be convinced that this viscus is not a single organ, a unit, but an organ composed of two hemispheres, of several lobes, and of an indeterminate number of convolutions, as we have before said; and that a plurality of organs can have no greater effect in destroying the unity of consciousness, than this multiplication of parts. Moreover, in what way are the forces described by Gall, as physical love, attachment, &c., more destructive of this unity, than the qualities admitted by metaphysicians, as attention, judgment, &c. Finally, if it be pretended that all these faculties are only modifications of mind, he cannot be refused the right of considering those designated by him in the same point of view, and this is precisely what he has done. "I am of opinion," says he, "it is a single principle only, which wills, smells, tastes, listens, which thinks, and reflects; but, to enable this solitary principle to acquire a consciousness of light and sound, to enable it to smell, taste, and touch; finally, to enable it to manifest its faculties, it requires the aid of various material instruments, without which, the exercise of all these faculties would be impossible." Such is the whole basis of the doctrine of Gall.

I shall forbear to speak of freedom of action, until I treat of free will, and will merely observe, at the present time, that from the laws of our organization, we cannot see magnitude in diminutive objects, find that pleasant which is nauseous, feel hot whilst we are cold, &c., so that, in fact, our impressions and their consequences, are as inevitable as our contact with the material bodies by which we are surrounded. This, with what I have previously said on the primary forces, is sufficient to demonstrate the errors into which the partisans of unrestrained freedom of action have fallen, and the fallaciousness of a doctrine which for some time past has enlisted many adherents; I allude to that new hypothesis which supposes that we view everything according to a certain system of preconceived ideas; a theory which totally destroys both reasoning and all liberty of action, and consequently all moral responsibility, at least in individuals, and reduces man and communities to mere machines.

This specious mode of reasoning, which is true in some of its applications, is evidently false in its principle, and at variance with most of its results. There is a wide difference between viewing everything through the medium of ideas dependent on circumstances, and derived from a course of education based on certain and determinate views, or through the influence of organs capable of a certain latitude of action, and from impressions made by the hand of nature, which cannot be the result of any prejudice. By the first, a nation becomes fanatical, sanguinary, enslaved, or free, according to the nature of the education it has received; by the latter, a nation, like an individual, is always tending towards a determinate object, suited to its nature and happiness. History, in fact, shows that a prevalence of the influence of the first has always been attended with changes, which were more or less modified by the differences existing at certain epochs. On the contrary, a system of immutable forces like the organization from which they are derived, when left uncontrolled, will always arrive at the desired results, with a minimum of efforts and time.

PART THIRD.

ANATOMY AND PHYSIOLOGY AS CONNECTED WITH CRANIOSCOPY.

I.

Of life, and the principal systems of organs that concur in its production.

Life is not a substance that can be seen, heard, or touched; but is a result produced in certain bodies, by the mutual and simultaneous action of the parts or organs of which they are composed. It is impossible to form an idea of this phenomenon, without numberless observations, and much reflection on the series of beings possessing this attribute. Nevertheless, the slightest attention on our part, to the bodies by which we are surrounded, will enable us to perceive the striking differences that exist between them. Thus, to the general properties of matter, as *weight*, *impenetrability*, *&c.*, to be recognized in minerals, are superadded in vegetables, *nutrition*, *reproduction*, the *secretions*, and certain *internal forces* by which they *turn to the* *light*, *attach themselves* to other bodies, *select* and *assimilate* such substances as are fitted for their sustenance, &c. It is by the presence of this second class of phenomena, that plants are distinguished from unorganized bodies, and to which the term *life* has been applied. But, as all the functions of which this kind of life is composed are merely the results of a blind necessity and of automatic actions, attributable to affinities arising from the general properties of matter, it has been called *vegetative*, *organic*, *automatic*, *internal*, or *nutritive life*.

In animals, all the phenomena of this automatic life are present, but more or less modified by their more perfect organization; and, in addition, they are endowed with properties of another order, as *locomotion*, *sensibility*, *volition*, and *intelligence*, qualities of a much higher order than those found in the other classes, and the union of which has been denominated *sensitive life*, *life of relation*, or *animal life*, because it is the principle of the relations that exist between sentient beings, and the bodies by which they are surrounded. In fact, whilst plants are fixed in the earth, and destitute of sensation and motion, animals, and above all, men, move, act, seek, avoid, and choose, with different degrees of free will. Thus, in the common acceptation of the word, *life*, in animals, is the complicated result of two very distinct orders of functions. One fitted for the *developement*, *growth*, and *nutrition* of the individual; the other, connected with *sensibility*, and all the intellectual and moral consequences which may arise from this property; the most elevated and mysterious of the animal qualities, as being the immediate constituent of *animality*.

These functions, which are more or less essential, are performed by *organs*, or *systems of organs*, with which the cranioscopist should be familiar. I would indicate the *digestive system* as the most special object of his researches; these organs consist of the mouth, teeth, stomach, and intestines, and are fitted for triturating the food, and for extracting all the nutritive materials contained in it; the *circulatory* system, the most important parts of which are the heart, which propels the blood into the arteries; the arteries, which convey it to different parts of the body, and the veins, which convey it back again to the heart; the *respiratory* system, of which the lungs are the principal organs; the *secretory*, including the kidneys, which separate the urine from the blood; the liver, which extracts the bile; the glands, which elaborate various fluids,

&c.; and finally, the *locomotive*, the principal agents of which are the bones and muscles.

II.

The nervous system in general.

But, of all these systems, the most important to the cranioscopist, is the *nervous*, as it is the principle of all our emotions, our sensations, and our thoughts; it *vivifies* all the others, and endows them with *sensibility*, or that faculty by means of which they become susceptible of certain impressions. To it, also belong those functions of the senses by which we maintain a relation with the external world; it is, in short, as is observed by Gall, the source of all the phenomena, of *animality* and *humanity*, from the simplest sensation, to the most elevated of the moral and intellectual faculties. For, as secretion or digestion cannot exist without a liver, kidneys, and stomach, so there will be a total absence of emotions, sensations, instincts, aptitudes, moral and intellectual qualities, &c.; in short, of all reason and will, if a nervous system be wanting. Man and animals, being incapable of affections and spontaneity, would, like plants, be reduced to three conditions of existence, birth, growth, and death. It is, therefore, necessary to treat this subject in some detail. In the superior animals, and in man, (we use the term superior animals, to denote those having the most perfect organization,) the nervous system is, in general, composed of elastic cords of different dimensions, which are distributed to all parts of the body, and gradually divide off into extremely slender filaments. For a long time past, physiologists have regarded these cords, which are enlarged in various parts into variously formed ganglions, or tumours, as arising from two very distinct sources; that is, they have admitted two different nervous systems, one composed of the *cerebro-spinal* axis, having under its control all the organs which constitute the life of relation, and under the empire the will; the other, formed of the *great sympathetic, and its ganglions*, presiding over all the actions of automatic life, the functions of which are independent of the will. Gall appears to admit as many nervous systems, as there are systems of organs; one for the digestive functions, one for each of the principal secretions, one for respiration, one for the circulation, one for the organs of voluntary motion, one for the functions dependent on the senses, and finally, one that presides over all the instincts, all the propensities, the intellectual and moral qualities, and is the seat of the mind.

The principal points in support of this doctrine may be reduced to the following: in the animals, which are lowest in the scale, and have but one single viscus, there exists but one ganglion, and its nervous filaments. But, where organization becomes more complex, and the viscera and functions increase in number, the ganglions and nerves, or small nervous systems, increase in like proportion, and finally, as many of these systems may be recognized, as there are distinct functions. In the second place, this law of increments, which we have just seen as applicable to the ganglionic system, holds equally good as respects the brain, which, quite simple in the lower animals, becomes complex in proportion to the increase of the faculties, and it will be found that the convolutions are better defined, and more numerous, as these faculties are more numerous and striking.

This doctrine receives additional confirmation, from the fact that each viscus is endowed with a special sensibility, of course indicating that there is a nervous system peculiar to each.

Finally, another proof that there is a nervous system appropriated to each class of the automatic or animal functions, may be assumed, from its having been shown that these systems are not developed simultaneously, but appear with the faculties over which they preside; or, in other terms, in exact ratio to the developement of the organs of these faculties. The same thing occurs with the different organs of the brain, these also being wholly independent of each other in their growth and decrease.

It might be supposed that these various nervous systems are inimical to that unity of action which ought to exist, and which is observable in every animal. But this objection falls to the ground, when the false ideas now entertained with respect to the nature of life, are abandoned, together with the prevalent custom of referring all that passes within us to a common centre, which exists only in our imagination, and which anatomists have in vain endeavoured to discover in certain important organs. Have those philosophers, who, wishing to revive long exploded ideas, have laid such stress on the *me* (*le moi*,) and its *unity*, given a clear definition of the one, or assigned a special seat to the other? Is this new entity, which they suppose to enjoy an independent existence, anything more than a purely metaphysical creation, a word that has been imagined to serve certain ends? Let us boldly seek for truth, by renouncing, on the one hand, erroneous ideas, and not endeavouring to explain things which are beyond all human cognizance; and on the other, by admitting those conclusions which are the natural result of a close study of such phenomena as are appreciable to our senses. Let us avoid touching on the soul and its attributes, but at the same time also, let us not condemn those physiologists who are of opinion that the material conditions by which its faculties are manifested, are discoverable in the organization.

If the various nervous systems have different functions, and are each fitted to preside over a particular order of organs, they are not, on that account, unconnected with each other. Nature has established such relations between them, as are necessary to produce that consentaneous action, so remarkable in their functions. In fact, all these systems have numerous inosculations and points of contact, thus uniting into one beautiful whole, all the multiplied actions, constituting what is termed life.

But can we, or ought we regard the brain as the exclusive organ, the sole source of all our faculties, and of all the functions of animal life?

This is a most important question. Although Gall adopted the affirmative, as the third principle of his doctrine, still this point cannot be considered as completely settled. It is true, that numerous facts may be adduced in its favour; but, on the other hand, there are many which appear wholly adverse to it. After having strictly weighed, not only the opinions of Gall, but also those of the most eminent physiologists entertaining opposite views, it has appeared to me that subsequent researches can produce but slight modifications in the general principles I have laid down; and that in the lower animals, we must admit the existence of different nervous systems, fitted for various degrees of intelligence; but that in the superior animals, no impression with consciousness, no perception with reasoning, no intellectual manifestation, no moral quality, can take place without a brain.

That I may omit nothing of importance appertaining to the nervous system in general, I must now explain some phenomena of another character. I have said that the organs of nutrition are under the influence of the great sympathetic nerves. But, in stating this fact, I did not intend to say that these organs were unprovided with any nerves arising from the brain, but merely that these were few in number, as compared to the others. The same observation is applicable to the organs of relation, that is to say, these organs are furnished with many more nerves from the brain and spinal marrow, than from the great sympathetic. This double disposition explains many facts of the highest importance. The slight influence of the will on the organs of automatic life, and its absolute dominion over those of animal life, is one of these. After the details already given, it is useless to say more on this subject. I will merely observe, that this arrangement displays one of the wisest provisions of nature. For it must be evident, that life would be greatly compromised, if the permanence of its most important functions were dependent on the will, and also that all liberty of action would disappear, if the organs of external life were under the automatic and perpetual influence of the ganglionic nerves; were this the case, man would neither be master of his actions, nor capable of watching over functions necessary to his existence.

A second phenomenon of this unequal distribution of the different orders of nerves to the various organs, consists in filaments of the great sympathetic being furnished to the organs of relation, in such proportion as to fulfil the functions of nutritive life, but not to interfere with the action of those that depend on the will; and the same is true with regard to the distribution of cerebral nerves to the organs of automatic life. This is always sufficient to enable the brain to perceive the effects of any stimulant applied to them, but at the same time not to produce such changes in their functions, as might be detrimental. This explains the mode in which we become conscious of certain wants, as hunger and thirst, of certain evacuations, of the pleasure or pain experienced in these organs, and of the feelings of suffocation we experience in the phrenic region, when we are under the influence of deep grief, or violent passion.

Finally—a third order of phenomena is furnished by those organs which receive an equal proportion of both ganglionic and cerebral nerves, and which, consequently, are under the simultaneous or alternate influence of both systems. The respiratory functions, which in a natural state execute their functions without any intervention on the part of the will, but which this power can nevertheless suspend for a certain time, are an example of this kind of double influence; the reproductive organs are another, &c.

III.

The great sympathetic and its ganglions, or the nervous system of internal and vegetative life.

Man being the principal object of our researches, I shall confine myself in what I have still to say on this subject, to a few general reflections on the two great divisions of the nervous system; one, as has already been stated, under the influence of the will, and the other, wholly independent of it. This latter is composed of two distinct parts, one peripheral, composed of two chains of ganglions, which descend in a curved line from the head, through the neck, breast, and abdomen, to the lower part of the pelvis, and which, approaching each other at their extremities, form a kind of lengthened ellipse, of which the spinal column forms the axis; the other, central and much more irregular, is formed of several ganglions, or nervous plexuses, which are situated in the splanchnic and precordial cavities. In both these divisions of the great sympathetic, the number of ganglions is by no means constant, and varies between certain limits; but each ganglion, or plexus, appears to be a centre, in which the nervous branches, formed by a union of all the filaments arising from the tissue of the organs, terminate; so that the size of each ganglion is, in most cases, in an exact ratio to the number and size of the organs from which it receives nervous irradiations. Those of the elliptical portion have frequent communications or inosculations with the cerebral nerves distributed to the different organs. Those of the centre are confined to the cardiac circulation, to the digestive, and to the urino-genital organs, and have but little connexion with the cerebral nerves; which explains, in a satisfactory manner, why we are unable to control the motions of the heart or intestines.

In general, this portion of the human nervous system is most abundant in the pelvis, where the organs of vegetative life are the most numerous; it diminishes as it ascends, and is lost in imperceptible filaments in the cranium; thus following an opposite course to the other part, which is most voluminous in the head, and insensibly diminishes as it descends.

Finally—the principal ganglions belonging to the ellipse, are: the ophthalmic, the three cervical, those of the thorax, to the number of ten or twelve, and those of the abdomen. Those of the central part, are: the semi-lunar and solar plexuses, placed near the diaphragm, or phrenic centre; the cæliac, hepatic, splenic, coronary, mesenteric, renal, spermatic, &c. I cannot speak at greater length of the various functions of these plexuses, without entering into anatomical details, incompatible with the nature of this work.

IV.

Of the cerebro-spinal axis, or the nervous system of external life, or that of relation.

This second division of the human nervous system comprehends,—1st. all the nerves by which we have a consciousness of impressions made on different parts of our body, by the various external objects by which we are surrounded;—2d. those by which we react on these same objects at will. It presents four very distinct parts: a cerebrum, a cerebellum, a spinal marrow; these three forming what we have called the cerebro-spinal axis, and eighty-six nervous cords, disposed in forty pairs, which extend from the axis to the various organs, in the tissue of which they are finally lost. In an anatomical point of view, these nerves are of two kinds: those which issue from the cranium, and are given off at the lower part of the brain, are termed cranial, or cerebral, whilst those which arise along the spine, are called spinal; these are subdivided into cervical, dorsal, lumbar, or sacral, according to the part of the spine at which they are given off. In physiology, these nerves are divided into nerves of sensation, and nerves of motion. The first are those appropriated to the senses, and by virtue of a peculiar property, are fitted to receive the impression of external objects, as light, sound, odours, &c., and to transmit these impressions to the brain; the latter are denominated nerves of motion, because, under the guidance of the will, they communicate motion to the different parts of the body by which we act, breathe, articulate, and express the internal emotions that we experience.

V.

Of the brain, its hemispheres, its lobes, and its convolutions. Hydrocephalus.

Until the time of Gall, anatomists treated the brain as if it had been the most unimportant organ in the body, and contented themselves with slicing it in all directions, without any other view, as I have before said, than that of describing the different forms thus produced. All the peculiarities of structure presented by this organ, never led to a suspicion that they were intended to fulfil wise purposes. They were perfectly acquainted with the utility of the different stomachs in ruminating animals, and with the folds with which they were furnished; but they had no idea of the functions of the hemispheres, the lobes, and the convolutions of the brain. They were, in like manner, ignorant of the purposes of the two substances composing this organ, the cortical and medullary; but such is the empire of truth, when enforced in the language of conviction, that many points of doctrine which were at first contested, are now generally admitted. Thus, all physiologists agree in opinion, that the brain is the organ of the highest functions in man and animals, that the cortical or gray substance is of a gelatinous nature, but that the medullary, or white, is composed of very delicate fibres, and forms a sort of skin, or membrane, thrown into numerous folds, constituting the convolutions to be remarked on the exterior of the brain; that these convolutions are the seat of the higher faculties, by means of which man compares, combines, and distinguishes the various impressions made on him, and thus arrives at a knowledge of their consequences and results. If on a perusal of Dr. Gall's works, we are astonished that so much remained unknown after the researches of so many anatomists, by whom the brain had been divided and inspected in all its parts, we are not less struck with the progress of science in this branch, since the publication of his investigations on this organ. And it is a matter of no slight congratulation to philanthropists, that his anatomical discoveries have tended so greatly to the amelioration of our institutions, and the treatment of our most afflicting diseases. It is thus that genius, guided by a philosophical study of things, sheds light on all it approaches.

If I had the time to follow the path of this discriminating observer, who was as methodical in his advances, as fruitful in his resources, we should always find him attacking the most inveterate prejudices; at one time combating in favour of the unhappy victims of insanity, consigned to unwholesome and loathsome cells, and subjected to a treatment, the brutality and error of which are a dishonour both to medicine and humanity; at another, acting as the advocate of individuals who, although suffering under the severest penalties of the law, merit our compassion, or perhaps our esteem, rather than our censure and our punishments; now protesting against those exclusive spiritualists, who, with their obscure metaphysics, extinguish all light, and arrest the progress of all true science; again, ridiculing those dissectors of the brain, who, although possessing good instruments, and some skill in using them, but despising his researches and discoveries, have never been able to discover, even after the most minute investigation, anything more than had been seen by others long before; and who have never been able to perceive that such a variety of parts, of so delicate and admirable a structure, must necessarily be designed for the performance of functions of a higher grade, than those of less elaborate organs. Always zealous for the interests of true science, and devoted to the advancement of truth, I rejoice, says he, to have been the first to have dared to attack the errors of our most venerated authorities, and to have occasioned the happiest changes, not only in the nature and treatment of mental diseases, but also in philosophy, and other subjects having an immediate relation with the happiness of man.

Let this doctrine be compared with those of metaphysical reasoners, or with the articles *mental alienation*, *insanity*, *mania*, *delirium*, *&c.*, in the *Dictionary of Medical Sciences*, and other works, and the striking differences that will be remarked, will prove, in my opinion, that positive knowledge, promulgated with frankness and confidence, will always triumph.

But, to return: I stated in the second part of this work, that the brain is composed of as many organs as there are propensities, aptitudes, or distinct fundamental forces, and that these forces act with an energy proportionate to the developement of the organ, or convolution appropriated to it; finally, that this developement took place from the centre to the circumference, and is at last manifested at the surface of the brain by a protuberance. But, it is necessary to add some further explanations on this point. According to Dr. Gall, it is a general law of the nervous system, that each nerve, after having received certain additions in its course, ramifies, and is lost in the organ or spot where its action is to be exercised; thus, says he, the nerves of touch are lost in the skin; those of voluntary motion, in the muscles; those of the senses, in the appropriate organ. Now, this is precisely what takes place, he continues, with regard to the brain, which he considers as a great nerve added to the spinal marrow. The different ramifications of this nerve are the convolutions, or organs composing the hemispheres, and which, receiving additions from the centre to the circumference, form a sort of nervous membrane, of about one or two lines in thickness, and having its whole surface formed of the ramification of the nervous fibres, or filaments.

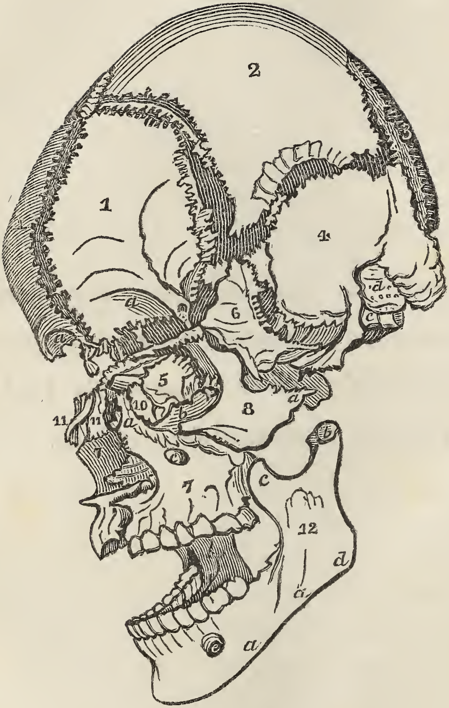
Some idea of this may be formed by the folds in a ruffle, or flounce; the folds represent the convolutions, and the hollows between them, the infractuosities spoken of by anatomists. The expansion of the olfactory nerve on the turbinated bones of the nose also forms plaits, or small convolutions, perfectly analogous to those of the brain, except that the latter are much the larger. It is, moreover, well known, that a brain in which the convolutions are unequally developed, presents hollows and protuberances of various forms and sizes on its surface. It must also be borne steadily in mind, that these convolutions differ exceedingly in form and size; thus, in one organ, the nervous expansion forms but a single convolution, whilst in another, it is thrown into several; finally, that the fundamental forms of these convolutions are, with very slight variations, the same in all human brains, and are always congruent in the hemispheres of the same brain.

It evidently results from this doctrine, that the object of nature was to multiply the surfaces of the brain, and that the convolutions may be regarded as analogous to the rolls composing the books of the ancients; the brain being a volume, of which the convolutions are the leaves, each of which is devoted to a different subject; it must, however, be observed, that they are not limited to this single passive function, but are at the same time the seat of active forces, which excite us to certain actions, and impel us to certain determinate objects.

To be fully enabled to appreciate the degree of developement which any part of the cranium may acquire, it is necessary to have an idea of its general conformation. Anatomists distinguish two orders of bones in the head; those of the face, and those of the cranium. The first are seven in number, but as they only concur in forming the cavity of the mouth and of the nostrils, I will pass them over. As to those which compose the walls of the cranium, or that osseous box containing the brain, they are eight in number; a frontal, two parietal, two temporal, an occipital, a sphenoid, and an ethmoid. But the two latter are so unimportant to the cranioscopist, that I shall confine my observations to the six others.

The *os frontis*, or frontal bone, is a segment of a sphere, the lower part of which touches the root of the nose, and extends on each side beyond the eyebrows; it forms, also, the superior portion of the orbits of the eyes, and comprises the whole forehead, reaching to about the middle of the crown of the head, where it is joined to the parietal bones. These parietal bones are concave, and almost quadrangular; they are united together at the median line, and form the largest portion of the cavity of the cranium; they extend from the frontal to the occipital bone, and descend at the side to join the temporal bones, which form the lateral parts of the head around the ears; finally, the occipital bone occupies all the lower part of the back of the head.

To render the above description more intelligible to those who are not anatomists, we subjoin the following representations of the bones of the head, from Chitty's Treatise on Medical Jurisprudence.


2
3
1
4
d
a
d
c
6
a
5
10
b
a
8
a
11
11
a
b
7
c
c
7
12
d
a
a

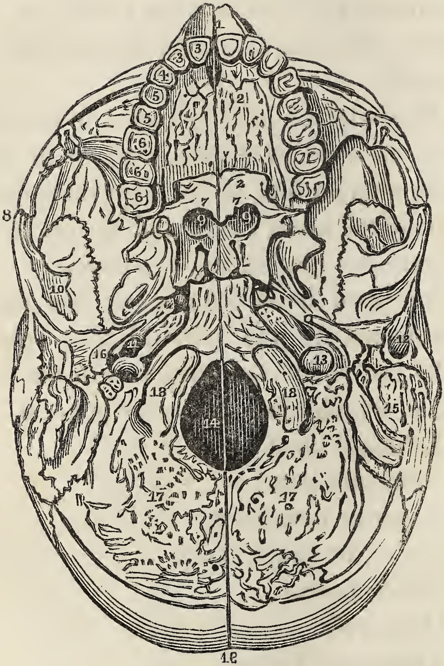
1. Frontal bone. The division shown in the plate, does not generally exist in adult age, though traces of it are always visible. *a a*, flat processes, extending inwards, forming the roofs of the orbits.

2. Left parietal bone, connected to the frontal bone by the coronal suture, and to its fellow along the median line, by the sagittal suture.

3. Occipital bone, connected to the two parietal bones, by the lamboidal suture.

4. Temporal bone, containing the internal ear, connected to the parietal and sphenoid bones, by the squamous suture. It has a long process, *a*, which joins the malar bone, 8.

5. Ethmoid bone.
6. Sphenoid bone.
7. Superior maxillary.
8. Malar, or cheek bone.
9. Palate bone.
10. Os unguis.
11. Two nasal bones.
12. Inferior maxillary.


1
3
3
3
4
4
5
5
6
6
6
6
2
2
7
7
9
9
8
10
11
16
12
13
18
18
14
15
17
17
19

1. Bony cavity of nose.
2. Bony palate, or roof of the mouth.
3. Two incisor teeth of right side.
4. Canine tooth.
5. Two bicuspid teeth.
6. Three molar teeth.
7. End of bony palate.
8. Zygomatic process.
9. Openings of the nose into the throat.
10. Cavity for head of lower jaw.
11. Carotid canal.
12. Orifice of the ear.
13. Canal for jugular vein.
14. Canal for passage of spinal marrow.
15. Mastoid process of temporal bone.
16. Styloid process.
17. Occipital bone.
18. Condyles of Occipital bone.
19. Median line.

But these bones, although described by anatomists as always presenting the same form and the same peculiarities of structure, differ considerably in the eyes of the craniologist, who perceives, in the different configurations they assume, and in their more or less arched form, an index to the intellectual and moral differences he observes in individuals. At the same time, to acquire an idea of the general form of the head, and of these accidental forms, it is indispensable to examine a great number of skulls, or busts.

An important question naturally arises at this stage of our inquiry, whether the brain invariably fills the cavity of the cranium so completely, that its form may be inferred from the external form or respective developement of its bony covering? It must be evident, that if this were not the case, there can be no truth in craniology; that is, if the external surface of the cranium did not present an exact model of the elevations and depressions of the external surface of the brain. Gall, convinced of the necessity of this coincidence, has endeavoured to prove: 1st. that the form of the cranium is owing to the centrifugal action exercised by the brain on it; 2d. that under usual circumstances, that is, when the brain is in a sound state, and the individual in good health, the brain so completely fills the cavity of the cranium, that the form of this latter is always an exact impression of the surface of the former; 3d. that no external circumstance, as the compression suffered by the head of an infant from the bones of the pelvis of the mother, at the time of its birth, or those produced among certain races of people carrying heavy burdens on their head, &c., are capable of altering the form of the cranium, as these accidental circumstances are insufficient to counterbalance the permanent and centrifugal action of the brain. Nothing but a constant pressure, is capable of producing an effect analogous to the deformity so remarkable in the craniums of the Caribs, and some other people.

According to Gall, the shape of the cranium, like the features, and the form of other parts of the body, is determined at the moment of conception, and the infant is born with a greater or less tendency to assume the peculiarities of its parents. It is, however, difficult to indicate the precise time at which the definitive developement of the brain takes place; it does not appear possible to fix it before the thirtieth year; perhaps, in most cases, it does not occur before the fortieth or forty-fifth; it is still more difficult to designate the commencement of its decline. At seventy years, Gall proved, by his writings and conversation, that his intellectual faculties were still unimpaired; he spoke and wrote with the same force and vigour of mind, as at thirty years of age; and it was not until about eighteen months before his death, and during his last course of lectures, that any failure in his mental faculties was perceptible.

At the approach of old age, the nervous system gradually loses its plenitude, and consequently its activity. "In all parts of the body, the nerves begin to shrink, the convolutions of the brain contract and diminish, forming pits and hollows; they become more widely separated, thus increasing the size of the infractuosities; in short, the whole brain become sdiminished in size." But it would be erroneous to suppose that any vacancy takes place between the brain and the cranium. The internal table of the latter is also altered in form, and continues to adapt itself exactly to the convolutions, and as the external table undergoes no change, a spongy substance is deposited between these two tables, so that the bones of the cranium, in extreme old age, are thicker and more spongy than at other stages of life. This, adds Gall, is a fact which cannot now be denied, although at first, many physiologists reproached me for my hardihood in daring to maintain such an absurdity in the presence of enlightened physicians and anatomists.

Gall has also ascertained by observation in the human species, and by direct experiments made on animals, that misery, famine, privations, and especially food of bad quality, or given in very small quantities, produce the same effects as old age; that is, a drying up or shrinking of the nervous system, and a diminution of the brain, which in turn produces a diminution of the corporeal powers, and of the intellectual and moral qualities, thus explaining the degraded state of certain nations.

PART FOURTH.

GENERAL CONSIDERATIONS ON THE PRIMARY FORCES OF THE MIND, AND ON THE DETERMINATION OF THE PARTS OF THE BRAIN IN WHICH THEY ARE SEATED.

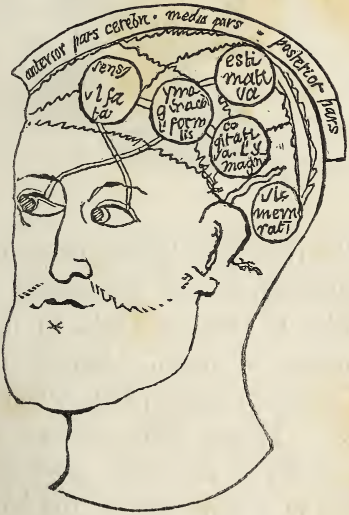
I.

Plurality of organs in the brain.

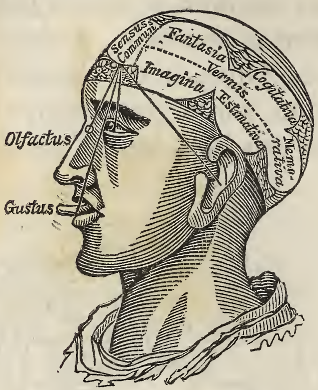
In the preceding sections, I have attended to the principal phenomena of organization, which may be regarded as forming the basis of intellectual physiology. I will now attempt to determine the number of the primary forces, and the seat of their organs. I have already observed that this part of Gall's system is considered as the least supported by facts. Many persons have even asserted that it is absurd and extravagant, and that it savours of folly and charlatanism, to endeavour to teach it; nevertheless, if this special determination of the faculties of mind, and their respective seats, be abandoned, the physiology of the brain loses all its interest, and the influence it would otherwise exert on the amelioration of our institutions, is utterly destroyed. Like all other psychological hypotheses, it becomes a useless doctrine, wholly incapable of affording any aid in our study of man, and of that labyrinth of passions, propensities, &c., which alternately exercise an unlimited sway over his actions.

These reasons, says Gall, have induced me to support this part of my doctrine by a mass of the most incontestible evidence. I am not ignorant, continues he, that the idea of submitting the manifestations of mind to anatomical investigation, is highly revolting to those who refer everything to sensation, or who reduce the faculties of mankind to a few, wholly independent of organization. I am also sensible, that those philosophers who delight in such abstractions as the unity of consciousness, the simplicity of thought, and the grossness of matter, as well as those who consider that the mind at birth is a *tabula rasa,* in order that they may, at their good will and pleasure, inscribe on it any folly that suits them, are far from having correct ideas on the moral and intellectual condition of man. I feel the extreme difficulty of bringing before these profound metaphysicians, an experimental doctrine of such simplicity, one which slowly advances by means of reiterated observations, and which is so well calculated to restrain the lofty flights of their genius, that they have openly declared that they do not wish to become acquainted with it. But truth and philanthropy urge me to proceed in the path I have hitherto pursued.

I think that I have proved that the brain is the exclusive organ of the instincts, the propensities, the sentiments, the talents, the intellectual faculties, and the moral qualities of man and animals, at least of those in which the brain differs little from that of man; and also that none of these manifestations should be regarded as the product of sensorial impressions, combined with education. But, to return to the summary of the facts collected by Gall, in support of the plurality of the cerebral organs. This plurality is not, by his own confession, a new idea, or peculiar to him; the ancients admitted three kinds of mind, each having a particular seat. The cerebrum had long been regarded as the organ of the perception or attention, and the cerebellum as that of memory. " St. Gregory of Nice, says Gall, compared the brain to a city, in which the going and coming of the inhabitants caused no confusion, because each set out from a fixed point, or arrived at a determinate spot." The Arabs also considered the first anterior ventricle of the brain, as the seat of common sense; the second, as that of imagination; the third, as that of judgment; the fourth, as that of memory. A sketch of a head by Albert the Great, in the thirteenth century, has reached us, which gives nearly the same location to the faculties, &c., as the above.



In the succeeding centuries, many authors treated on the same subject, and one of them published an engraving in which were represented the seat of common sense, of imagination, of reason, of memory, &c.



After the revival of letters, many of the most learned anatomists and naturalists entertained ideas similar to those of Gall, on the plurality of the organs of mind. Among these, were Willis, Vieussens, Haller, Van Swieten, Bonnet, Mayer, &c. Hence, some writers who wished to deprive Gall of all credit, have made use of these facts, to deprive him of the honour of his discoveries; but, he was always more solicitous to establish his system on solid foundations, than to defend its priority, and therefore wisely endeavoured to accumulate proofs which were far more conclusive than the opinions of the learned men just alluded to.

The limits I have assigned to this work not permitting me to follow him into the details he has given, I will conclude with the following summary of them: that wherever the cerebral faculties differ, there is also a difference in the structure of the brain, and in all cases where they are similar, all the differences that exist arise merely from the intensity of the propensities, &c.; that the number of the faculties is always proportionate to the number of the convolutions, and that the energy of the latter always corresponds to the developement of the former.

That the convolutions situated beneath the frontal bone in man, and in which are evidently seated his characteristic faculties, are wanting in animals, or exist in a rudimental form in exact proportion to the feebleness of these faculties in them; whilst those situated on the lateral and posterior parts of the head, and which are the seat of the animal faculties, appear analogous to those found in the same situations in animals; that the epoch when each faculty begins to appear, always corresponds to the developement of the convolution shown to be the organ of this faculty; that the over exercise of a single faculty of the mind does not fatigue the whole brain, but that the sense of weariness is felt in one spot only; that the hypothesis of the identity of brains is opposed to the evidence of facts, and to all intellectual physiology, supported as this latter, by the most unanswerable results. Finally —Gall has deduced a series of facts of another character, from the numerous pathological observations on lesions of the brain collected by him, and which may be regarded as additional proofs, as most of these facts are only to be explained by a plurality of organs, but are wholly inexplicable, if the brain be considered as a unit.

In addition to this, it should be borne in mind, that in all other parts of the body, each function is provided with its peculiar and appropriate organ; why, therefore, should the brain form an exception to this general law? It is repugnant to reason, to suppose that an aptitude for the arts, a talent for music, and for calculation, an instinct for the perpetuation of the species, a propensity to accumulate, a love of destruction, benevolence, veneration, &c., all emanate, *pell-mell*, from a part of the organization that nature has carefully enclosed in a solid case, with the evident intention of protecting it from everything that might be inimical to its functions; and it is equally absurd to assert that an organ whose external structure is so delicate and admirable is a mere unformed and chaotic mass.

II.

The insufficiency of all attempts, previous to the time of Gall, to explain the nature of man and animals, or their passions and propensities.

It is now generally acknowledged, that neither the absolute size of the head, its relative dimensions as compared to other parts of the body, the facial angle of Camper, the occipital line of Daubenton, nor several other peculiarities of conformation which have been successively proposed, as the relative size of the head and face, the length or shortness of the neck, &c., are sufficient to explain the various aptitudes of man or of animals, or to afford a correct mode of estimating the powers of mind, or the intensity of the passions; and that a recurrence must be had to other means, to arrive at a plausible explanation of these phenomena. But what I have said in the preceding pages demonstrates, if I am not greatly mistaken, that no doctrine unites so many proofs in its favour, as that of a plurality of organs in the brain; much, however, remains to be discovered, before the problem can be fully solved; two difficult questions are yet to be determined—the number of the primary forces, and the parts of the brain in which they are seated.

I will in the first place show, that as a general rule, a mere knowledge of anatomy can never lead to a discovery of the intellectual forces, nor of their organs; for, as is observed by Gall, an acquaintance with the anatomy of the heart did not induce the discovery of the circulation of the blood; neither did the dissection of the liver demonstrate the secretion and nature of the bile.

A second principle laid down by Gall, in this kind of investigation, is, that to proceed with any certainty, a knowledge of the functions should always precede a study of the organs on which they are dependent; this is the method he scrupulously adhered to in his researches; he studied the characters of persons who displayed a marked talent or propensity, and afterwards sought on their heads what protuberances were the most evident, and likely to be the seat of these peculiarities. Thus, having found that in all great mathematicians, the outer angle of the super-orbital ridge was very much arched or elevated, he was led to conclude that a certain relation existed between this conformation and a talent for numbers.

A third principle inculcated by Gall, is, that pathology and physiology are of great importance in the discovery of the primary forces, when a proper use is made of them, and when the mind of the observer is not unduly biassed by prejudices. But, at the same time, Pinel, Esquirol, and many other distinguished physicians and physiologists, had been witnesses of a multitude of the most conclusive pathological facts, without deducing anything from their observations in favour of organology.

Gall absolutely condemns the dissections and mutilations practised on living animals, with the intention of ascertaining their radical faculties. In these cruel experiments, the animal suffering the most agonizing torments, and the most frightful convulsions, cannot manifest any of its natural instincts or propensities, and it is impossible to draw any conclusions from the groans and struggles that are induced by the knife of the operator, added to which the hæmorrhage, irritation, inflammation, and other results which

Probably protested the elephant, too.—W/-

380

are the consequence of these mutilations, are fertile sources of errors and misconceptions.

The employment of comparative anatomy and physiology, in the determination of the primary forces, requires much circumspection and knowledge; for, as animals descend on the scale, the difficulty of interpreting their cerebral organs increases. Their faculties, instincts, propensities, and organs, being wholly different from those of man, we have no common feelings with them, and are consequently incapable of appreciating and explaining their sensations, propensities, and desires.

Finally—if to all these difficulties, and the insufficiency of the means employed to surmount them, be added the ignorance that existed as to the properties of the nervous system, the habit of considering the brain as an organ whose functions were performed differently from those of the other organs; if the prejudices of philosophers, and the custom of theologians, to cry anathema to all who sought analogies between the propensities of man and those of animals, be taken into the account; if the decided tone be considered, with which these learned psychologists maintained, and still maintain, that the love of children in woman has no analogy to the attachment of mothers to their offspring; that man *loves*, merely because he wished to love; that he *murders*, because he wishes to murder; that he *sings*, because he wishes to sing; that he *eats*, because he wishes to eat; that he learns to *read*, to *write*, *&c.*, because he wishes to do so; if it be recollected that they have erected instinct in animals into a special entity, and attributed every animal faculty to it; that they deem all animal actions as fixed and irrevocable, whilst in man they are wholly under the dominion of his will; we shall not be astonished that many learned physiologists have become bewildered amidst so many errors and vain hypotheses, notwithstanding the numerous facts that were daily presented to them.

III.

Nature of the primary forces, and determination of their organs.

By what characters are we to ascertain whether a propensity, an instinct, an aptitude, or a quality, is primary? How are we to determine the portion of the brain that is the organ or seat of this quality? I have found much more difficulty, says Gall, to solve the first of these problems, than the second. I have, however, continues he, met with obstacles even in the former, which I have not been able to remove; but I have also ascertained several manifestations of mind, and the organs on which they depend, but which I am unable to reduce to their primary forces. Qualities and faculties also exist, of which it is difficult to ascertain, whether they are real primary forces, (*sui generis*,) or simple modifications of certain qualities or primary faculties, or a mixed result of the simultaneous influence of several fundamental forces. Whenever I apply to others to obtain greater light and more information respecting them, I am asked, what need is there to seek for other faculties of mind, than intelligence and will? Man is an architect, a mathematician, a poet, a musician, solely because he has applied the powers of his mind to architecture, mathematics, poetry, or music; he is fond of children, he is a robber, he is ambitious, because such is his will and pleasure. I may in vain ask why such a one has applied himself to architecture from preference? why another finds pleasure in theft, a third in political life, &c.? If I show that one animal constructs its habitation with great skill, that another displays wonderful foresight, the reply is always the same; it is *instinct*, and with this word it is expected that everything can be explained. Thus, intelligence, will, and instinct, are the three pivots on which the study of man and animals revolves. The three forces by which philosophers explain all the faculties and aptitudes of the one, and all the actions of the other. But, if some details respecting their essence be demanded, all becomes vague and unintelligible?

In the midst of this uncertainty and ignorance, says Gall, I devoted myself exclusively to observation, waiting with patience and resignation for the results I might obtain; I confined myself to the collection of facts, and the recording of the circumstances under which I observed them. I did not attempt to explain them, for fear of losing sight of the reality, and of permitting my judgment to become the dupe of my imagination.

After these avowals made by Dr. Gall, and which indicate both frankness and modesty, the reader must not expect details at this time, which belong to another era of the science. I will confine myself, therefore, at present, to some considerations calculated to explain, in some degree, the nature of the primary forces.

In every age, philosophers admitted general faculties, as attention, reflection, judgment, memory, and imagination, as primary forces of the mind; but, these being common to all mankind, cannot serve as distinguishing characteristics of individuâls, nor explain their aptitudes; for, as they only differ in the degree of their power or intensity, it is almost impossible to appreciate these slight variations. Naturalists, on the contrary, in their designation of species, have paid attention to the most striking instincts and aptitudes, and have considered as primary qualities, such only, as had a marked influence on their habits and manners; thus, they say that the wolf is ravenous, the fox crafty, the weasel sanguinary, the beaver industrious, the dove timid, &c.

Gall, being desirous of treating of the study of man and that of animals on the same plan, asserts that we ought not to admit any as primary forces, except such as are constantly present, and predominate over all others; and in support of this opinion, adduces the example of biographers, and of common usage, in distinguishing every individual by the talent or propensity that is most marked and characteristic in him; thus, observes he, this man is said to have been born a musician; that one, a poet; one to have an innate talent for mathematics; another for drawing; this to have a passion for building; that one for travelling, &c. This method, it is evident, supposes that the qualification mentioned, designates with precision, the most striking point of the character. We must therefore consider them as true primary forces in man and animals, and look upon attention, memory, judgment, imagination, &c., merely as the common attributes of these forces, and not as the primary forces themselves.

It is thus, adds our author, that natural philosophers do not employ the general properties of bodies, as size, divisibility, weight, &c., to designate each particular substance, but resort to special qualities for this purpose; or, in other words, those which are peculiar to the body they wish to describe. Thus, to designate gold, they do not say that it is an impenetrable, divisible, heavy substance, but that it is a ductile, malleable, sonorous metal, of a yellow colour, &c.

To these elucidations of the nature of the primary forces, I have a few words to add on the different modes in which they are generally presented to the observation of the craniologist, and on the means of discovering their seat. In the first place, there are many errors to be avoided: thus, we should be deceived, if we took for granted that the profession of an individual always indicated his most striking propensity. In a majority of instances, as was observed by Horace, eighteen centuries ago, we find ourselves embarked in a profession, from the effect of accident, and even against our inclinations. Prejudices of parents have made lawyers and physicians, says Gall, as the caprices of sovereigns have made generals and ministers; nature and inclination being allowed no weight in these appointments. It is a mistake, to suppose that all the primary forces are manifested in so open a manner as to be clearly evident; they often remain in a dormant state, from their never having been called into action; but, still more frequently they remain unnoticed, although existing in full energy, from the possessors of them having never fallen under the observation of those who were capable of appreciating and detecting them. Finally, it is also erroneous to suppose that every person has a knowledge of his own peculiarities of mind, &c., and to place reliance on his statements respecting them. Neither must we be deceived by individuals who believe that they are endowed with qualities, and yet who present no developement of the organs of those qualities. But, we may be certain that an inclination or talent is primary, when, notwithstanding all obstacles, an individual succeeds in demonstrating or exercising it; thus, the spirit of calculation was innate with Pascal; that of poetry, with Regnard, &c. We may also assume that the occupations to which we resort with pleasure, and devote our leisure moments, are, in a generality of instances, in unison with our innate propensities. Usually, we attach but little importance to what does not interest our real disposition; but when any topic is touched upon that tallies with our favourite inclinations, we experience the most vivid interest.

If attention be paid to the manner in which an individual condemns or approves, praises or deprecates the usual topics of conversation; what are the events that interest him the most, the kind of society he prefers, his conduct in difficult and delicate situations; if he be an author, the manner in which he expresses his thoughts, the nature of his ideas, &c.; we shall rarely be mistaken with respect to his primary dispositions or forces.

If you wish to ascertain the character of a person without any risk of mistake, even, says Gall, if the individual is aware of your intention, and therefore on his guard, induce him to converse on his infancy and boyhood; to relate his school tricks, his conduct towards his parents, his brothers, sisters, and comrades; the subjects of his emulation, friendship, or hatred; his amusements, &c. The objects of his tastes and pleasures have changed, it is true, with the difference of years; polished manners, a refined language, and dissimulation, may mask the character, but, rest assured, it remains the same.

Having thus ascertained the propensity or dominant faculty, examine the head of the individual, and remark the peculiarities of conformation it may present. Multiply your observations on the same force or faculty, and ascertain if it always corresponds to the same part of the cranium, and if its organ is always developed in the same form. It should be observed, that the satisfactoriness of your results will be increased, by pursuing your observations on persons in whom this faculty of force is strongly marked and predominant.

But beware of being imposed upon by the dictatorial assertions of those speculative and transcendental philosophers, who maintain that particular facts, however numerous they may be, have a subjective value only, and can never authorize the establishment of general laws, because there is no certainty that in all cases not examined by you, the exceptions to the rules you may have established, are not the most numerous. It is not enough, they say, to have remarked a deficiency in the organ of philoprogenitiveness in twenty women who had committed infanticide, to conclude that there must be some connexion between the crime and the organic deficiency. I have often seen Dr. Gall place his hand on the organ of firmness and perseverance, and observe; without this organ, I should long since have abandoned my researches. Besides this, never neglect (such is the recommendation of Gall,) to consult collections of skulls, wherever the opportunity for so doing presents itself. The craniums of known individuals are the most instructive; plaster casts are also very useful; but busts and medals are oftentimes very defective, and portraits still more so. You must be exceedingly cautious in deciding on the conformations they may present to you, and place no confidence in them, until you have verified their truth in the most satisfactory manner. Finally, you are not to neglect counter proofs; that is, after having examined an organ in many individuals in whom a certain faculty was strongly marked, you should examine this faculty in other persons in whom it was at the zero of developement. If, instead of a protuberance, you always find, in the latter case, the same part flattened or depressed, it is evident that your motives for a belief in the doctrine are much strengthened.

IV.

General considerations on the mimicry of the primary forces, or the various forms in which they manifest themselves in man and animals.

I HAVE several times spoken of the manifestations of mind, and shall now continue my observations by establishing some general principles on the various modes of expression they assume in particular circumstances. I have already stated that there are certain actions, as those of the heart, the blood, and the intestines, which are immediately dependent on organization, and over which we have no control; those which result from the impulse of a primary force, are of the same character, in some respects; that is, they are produced by a kind of *automatic spontaneity*, and take place without any consciousness or intention; in fact, when we experience an emotion, a sentiment, an idea, a desire, or a passion, do we reason on the gestures which always accompany their expression? Do not these gestures take place instantly, and are not their significations understood by all? Certainly they are: for they are the result of laws as determinate and invariable as the organization on which they are dependent. This force of the organization which connects each sentiment, &c., with certain determinate movements or actions, and thus subjects the manifestation of all our affections and thoughts to immutable and universal laws, is at the same time the principle on which all the relations that exist between animate beings reposes, and the basis of that natural language by which all individuals of the same, or even of different species, mutually communicate their wants, fears, or desires. To how many dangers and mistakes would we not be exposed, if a constant and necessary harmony did not exist between our internal actions, and those of our fellow-beings of which we are unconscious, and those which are external and under the cognizance of our senses.

If the same expression appertained equally to hatred and friendship, or to grief and joy, how should we be enabled to ascertain what we have to fear or to hope from the actual disposition of an individual, or whether it would be prudent to greet or avoid him?

This law is, therefore, a double boon of nature to all animated beings; a bond by which we are in communication with every people and with all ages, and a useful monitor by which we are enabled to avoid those accidents and dangers which environ us at every step. Without it, how would we be able to explain the expression of the dying gladiator, or the agonized countenance of Laocoon, sinking under the weight of the reptile that is crushing him in its murderous folds? Without it, how should we distinguish the voluptuary from the ascetic, the bully from the peaceful, the ambitious from the modest, despair from hope, jealousy from generosity, irony from frankness, hypocrisy from piety, &c.

Gall, under the name of *mimicry*, has included those gestures and natural movements which accompany the action of a radical force; but, I have already observed, that these vital phenomena must not be confounded with *pantomime*, the object of which is to reduce all the events of nature to regular rules of imitation. Mimicry, in the sense in which Gall uses it, includes those movements or actions which are the immediate product of the intimate connexion that exists between our aptitudes, and the play of the instruments destined to manifest them; pantomime is an art on which dancing, drawing, painting, sculpture, theatrical declamation, &c. depend.

To fully comprehend the extent and permanency of the effects of this law, by which the humble in every country may be recognized by their bent back, and downcast looks; whilst the proud, says Gall, are to be known by the elevation of their head, and dignified carriage; it must be recollected that all our perceptions are referable to the brain, and that this organ is also the source of all voluntary motion; it must likewise be remembered, that all individuals of the same species, being endowed with the same organs, receive the same impressions or ideas from external objects, and from their being obliged to manifest them with the same instruments, they are necessarily subjected to an uniform and invariable mode of doing this, and which may be reduced to the following conditions.

The organs of the primary forces act in various modes on the head, and communicate movements to it, which are in a compound ratio to the position they occupy in the brain, and their distance from the axis of this mass. To fully appreciate the mechanism of these movements, it must be recollected that the head is placed on the neck as on a pivot, and that the motions of which it is susceptible, take place on the side on which the organ that excites them is situated; so that the organs placed in the occipital region, or the inferior posterior part of the head, raise it or draw it backwards; whilst those which are located in the frontal region, or the anterior superior part of the face, tend to incline it forwards, and depress it towards the breast. For the same reason, those which are situated at the sides of the head, draw it alternately towards each shoulder, and those which are at the apex, fix it in a vertical position, or direct it towards heaven. It is also to be remarked, that in these various movements the impulse is single when the organ is situated in the median line, and hence the motion takes place but in one direction, whilst in all cases where twin organs of the same force are placed on each side, and at a distance from this line, the motions are alternately from right to left, or *vice versa*, according to the predominance of one of the organs.

These principles being well understood, all movements that can possibly occur, can be readily explained, either by the exercise of a single force, or the combined action of several. Thus, for example, in the generative act, all animals throw their head backwards, because the cerebellum with which this act has relation, being placed at the back of the head where it is connected with the neck, evidently must produce this effect. On the contrary, in acts of kindness the body is thrown forward, and friendly greetings are performed by motions which alternately depress and elevate the head, because the organ of this force is placed in the middle and upper part of the forehead. In vanity, the organs being placed on each side, and at a distance from the medial line, the head is successively turned from side to side.

Although these principles are not voluntary, though invariable in their application, it must not be overlooked that they may be powerfully modified by three essential circumstances, and that in such case it is extremely difficult to distinguish, in the movements that take place, the species and the intensity of the various emotions that tend to produce them. The first of these arises from the degree of sensibility of the individual: thus, in one, all the sensations are obtuse, and the passions are never violent, but are exercised with a certain sang-froid and calmness; in another, on the contrary, excitement may be extreme, and the slightest spark is followed by an inextinguishable flame. The second results from the complication that always occurs in the manifestation of our desires and affections; it is seldom, in fact, that one feeling alone predominates; it is almost always complicated with a number of secondary excitations, that modify it in a greater or less degree. Pride, for example, is differently manifested when it is excited by contempt or irony, shame or vengeance, hope or jealousy, &c.

Finally, as I have before observed, the burning heat of the tropics exercises a very different influence over the primary forces, than the freezing temperature of the polar circles. The music of the south is totally dissimilar to the melancholy chants of Ossian, and the burning passion that exists in the harems of the torrid zone, insensibly declines and degenerates as we approach the cabin of the Laplander or the Esquimaux, where it becomes a mere propensity, scarcely differing in force from other domestic feelings. It is in the temperate zone, says Gall, that man has always attained the highest degree of perfection of which he is susceptible; under the extremes of heat and cold, his powers are always diminished. In the first case, he is violent in his affections, feeble in judgment, and devoted to animal pleasures; in the latter he is dull and stupid, moderate in his desires, and in both he is mercenary.

V.

Reflections on organology, and the results of the action of the primary forces.

If what has been said, is clearly understood, the exact meaning of the expression *fundamental or primary faculties*, will readily be perceived. It has been shown that they are forces inherent to sensibility, which induce certain actions, without any determinate predilection for any particular object. It is important to bear in mind, that these forces cannot be derived from the same source, nor be the product of a single organ, for they are not developed simultaneously, and they act separately and independently of each other, and finally, that they decline and disappear at different periods. Moreover, like all the other functions of the life of relation, they are subject to alternations of activity and repose, to anomalies and alienations which depend on causes analogous to those which derange the other powers of life. Finally, notwithstanding our ignorance of the number of these forces, it cannot be doubted that every species of animate beings is furnished with a certain number of them, which are the same in all individuals of the species, with the exception that there may be a predominance of one or more of them.

It is also important that we should be able to distinguish in a primary force, what is fundamental and natural, from what is accessory and injurious, and what is owing either to accidental causes, or social circumstances, as education, prejudices, &c. The qualities of animated beings, like the properties of inorganic bodies, have their advantages and their disadvantages; what good is there, for instance, in the unsupportable noise produced by the coppersmith in moulding the objects of his trade? Nevertheless, the elasticity that gives rise to this noise, is a valuable property of the metal; so also the centrifugal force with which the wheels of a carriage shower water or mud over a by-stander, is certainly a nuisance, although this same force regulates the motions of the planets; so also in animals, courage is very useful in variety of circumstances, and yet is the cause of death to the bully who quarrels with all the world; so, in like manner, the propensity of acquisitiveness, which, when properly regulated, produces a wise and prudent economy; becomes, when unrestrained, an inexorable tyrant, without pity or remorse.

It is therefore with the primary forces, as it is with everything that exists, in their exercise it is impossible to avoid inconveniences and abuses which result from the very qualities that render them most valuable. It is a general law of nature, against which resistance is of no avail; but, at the same time, I maintain that the legislator may, by wise enactments, considerably diminish, and even almost annihilate the evils under which society has so long suffered. And in proportion as they become better understood, it will be easy to combat and regulate them.

Another general law, which I have likewise already indicated, is, that whenever nature wishes to produce great effects, she employs great means. Thus, if she wishes to develope great strength, she forms large muscular masses. If she intends to render a part more sensible, she provides it with a greater number of nervous fibres. Thus, also, where she has created a great painter, a great mathematician, &c., the convolutions which are the seat of the faculties which concur in producing this result, are proportionably large. But, it must be remarked, that nature is not thus limited in her operations, but is capable of choosing the mode of action most favourable to her views. To comprehend this, it must be borne in mind, that natural phenomena, considered in relation to their causes, are of two kinds; the one take place between bodies, and are always in an exact ratio to the size of the mass. Thus, an elephant is stronger than a horse; a block of stone is not as readily moved as a brick, &c. The others are dependent on the actions which take place between the principles of bodies, and bestow an astonishing energy on apparently trivial causes, such, for example, as the violent explosion caused by the vaporization of a few drops of water, the effects of lightning, &c.

Such, also, are a majority of the effects of life, and especially those of the nervous system, which is the principle of it, and in which we remark no proportion between the effect produced, and the cause to which it was owing. The brain, therefore, is not limited to simple mechanical movements, but acts like the fluids, and more especially like electricity. You whisper, for instance, in the ear of an individual, that he is about to be arrested, an electrical shock, as it were, instantly pervades his whole system, and the effect is far greater than could have been produced by the percussion of a few molecules of air on the tympanum. Newton has proved that attraction is in an inverse ratio to the square of the distance. What power of numbers can express the effects of electricity, or of the nervous fluid which appears to be a modification of it? But, my business is only to speak of the material conditions by which the manifestations of the faculties of the mind operate, I therefore shall say nothing more of this sacred and unintelligible principle, except that the above ideas were suggested by the following passage in the works of Cuvier. "There is every appearance that nerves act on the muscular fibre by means of an imponderable fluid, as it has been demonstrated that they do not act mechanically, &c."

It is now fully understood that, according to the principles of Gall, two sets of organs are necessary to the operation of each of our faculties, and that the intensity of these faculties is in a compound ratio to the size of these organs, and of the energy of the fluid by which they are stimulated. In fact, legislative organs are requisite, each possessed of consciousness, and of experiencing and communicating the impulse which they are capable of producing, and also organs fitted for the external manifestation of these impulses, or which reduce them to action. We require, says Gall, organs which are the principle, and others which are agents or instruments. The convolutions of the brain, are the first; the senses, the limbs, the mouth, &c., the second of these sets of organs. Thus, the cerebellum is the legislative organ of amativeness, and the various parts of the erectile system are the agents. The posterior convolutions of the cerebrum, are the organs of friendship, and of love of offspring. The arms, the eyes, and the voice by which these sentiments are manifested, are the instruments; and it is the same with our other faculties. None of them can be exercised without the concurrence of these two kinds of organs. In vain is the idiot furnished with hands equal to those of Michael Angelo, or Raphael; they are useless, and can accomplish nothing of themselves; a force is requisite to communicate an impulse to them, an intelligence to direct them, or, to speak more phrenologically, the organs of colouring and construction must exist, before these instruments can be successfully employed in the arts. So, in like manner, these organs would be useless without the aid of the hands.

I will terminate this chapter with a few reflections on the following questions, which have oftentimes been asked of Gall, and his pupils. Does a form of the head exist, which may be considered as a type of all others? What is the most perfect form of this part? Can the cultivation of any particular faculty and education, change the form of the head; that is, cause the developement of any particular organ? The first of these questions evidently demands, if there is any human being who can be considered as the model of the race? And the second requires to know, if there are qualities which are superior to others? It is evident that mankind will always be at variance as to the proper solutions of these questions. One person prefers courage, another science, a third benevolence, a fourth generosity, &c. I will content myself in answering them by the following observations of d'Alembert. "He that had to choose between Corneille and Newton, and should feel no embarrassment in making his choice, would not merit the privilege of choosing." As regards the third question, Gall entertained no doubt but that the organs of the brain, like those of the body, were capable of developement by proper exercise.

I now proceed to a description of the primary forces. It will present no difficulty or ambiguity to such of my readers as shall have fully comprehended the explanations in the foregoing chapters.

PART FIFTH.

ORGANOLOGY, OR A KNOWLEDGE OF THE PRIMARY FORCES, AND DESCRIPTION OF THEIR ORGANS.

I.

Physical love.

Synonymy. Organ of reproduction. Instinct of generation. Venereal propensity. Generative energy. By abuse, the source of incontinence and libertinism.

(*Amativeness.* Order 1st. Effective faculties. Genus 1st. Propensities. SPURZHEIM.)

Situation and description. The cerebellum is the seat of this organ, which, when much developed, forms two prominences, one on each side, above the hollow of the neck. The nape of the neck is then large and thick, and the ears widely separated from each other.

Natural history. Gall was led to the discovery of this organ, by observations made on a young widow under his care, and who suffered much from the state of continence in which she lived. He remarked, that before the attacks of nymphomania to which she was subject, she always complained of a feeling of extreme tension in the region of the cerebellum, which caused her to throw her head backwards. Gall, who one day attempted to relieve this by sustaining her head with his hand, was struck with the heat and size of this part, and hence suspected, as several authors had previously done, that there was some unknown relation between the cerebellum and the propensity. In the present state of the science, it is impossible for any truth to unite more proofs in its favour, than that this part of the brain influences the sexual passion; but, to understand the full force of these proofs, several circumstances that may modify the developement or expression of this propensity, must be taken into the account. In the first place, different degrees of intensity must be admitted. Thus, it is said that certain individuals, as was the case with Newton and Kant, testify a marked repugnance to the female sex. Other persons possess this propensity in a moderate degree, as is generally the case among the labouring class, when the man, exhausted by his daily exertion, thinks only of satisfying his hunger, and repairing his exhausted energies by repose. Finally, in some individuals this propensity produces an excitement and species of madness, which it is very difficult to moderate. Gall mentions a German bishop, in whom a cure could be procured only by castration. In these different circumstances, the size of the cerebellum is always in proportion to the propensity. When this is but slight, the cerebellum is very small, or almost wanting, as in children. It is increased in size if the propensity is marked, and finally, in the third case, is very voluminous.

As to that class of voluptuaries who reside in large cities, immersed in the luxuries and vices of the day, and whose habits tend to produce a permanent excitement of the nervous system, it must be evident that they form an exception to any general rule. In them, salacity and devotion to pleasure are the result of an artificial stimulation of the cerebellum, and even of the whole brain, and not of its developement.

We must also except those individuals who are tormented with a singular predilection for their own sex, whilst at the same time they entertain the strongest aversion to the other. Gall observes, that men who are afflicted with this species of alienation, as Nero, for instance, have in general a small head, delicate features, dimpled hands, and developed breasts; whilst females, on the contrary, are masculine in appearance and manners. Finally, Gall is of opinion, that example, or even association with women of easy virtue, are not sufficient to corrupt young persons, if the propensity does not exist; and that, on the contrary, when it does exist, every precaution is useless. He also states, that he has seen a young female, in whom the cerebellum was exceedingly small, who, as is the case with infants, experienced no shame when naked.

Mimicry. When this organ acts with energy, the head and body are thrown backwards, the whole erectile system, as well as the attributes and actions, announce the species of delirium with which the individual is affected.

II.

Love of parents for their offspring.

Synon. Love of offspring. Organ of maternity. Philogenesis. Maternal love. Maternal and filial piety.

(*Philoprogenitiveness.* Propensities. SPURZHEIM.)

Situation. This organ is placed immediately above the preceding, on each side of the median line. When it is much developed, it forms a large prominence above the centre of the neck.

Natural history. Gall had long remarked that the posterior portion of the head was more prominent in females, children, and monkeys, than in men, but was unable to account for this conformation. At last, a clergyman who attended his lectures, led him to the true solution by observing to him that love of their offspring, was very striking in women and female monkeys; and having afterwards verified the presence of the prominence in all animals, and in every individual of the human race in whom the propensity was marked, this organ appeared to him as conclusively established, as that of amativeness. It is not possible, says he, to refer the mutual attachment of mothers and children to the mere phenomenon of suckling, as it is met with in males, and in the females of many species of animals which do not suckle their young. Neither can it be attributed to certain moral qualities, as in animals in whom these qualities are very feeble, the propensity is often manifested in a much higher degree than in the most intellectual women; moreover, whenever it is wanting, a depression will be found, instead of a prominence on the cranium.

Of thirty women I have seen, says Spurzheim, who had committed infanticide, twenty-five had the organ very slightly developed, and the others had been led to the commission of the crime, from the urgency of circumstances; finally, adds he, I have always found the organ very much developed in all women who manifested extreme love for their children. This organ, like all others, sometimes presents strange anomalies. To those already mentioned, may be added several varieties of monomania; among others, that of a woman in whom the organ was excessively developed, and who believed she was always pregnant with six fœtuses; that of women of very cold temperaments, and who are very fond of children; that again of women of the most ardent temperaments, who detest them, &c.; finally, although society is but little benefited by the results of this propensity, it is a fact, that all animals in whom it is wanting, are generally more savage and voracious than those in whom it is found; it is this propensity that induces young girls to play with dolls, and renders them so solicitous to be employed about infants.

Mimicry. The mimicry of this organ is calmer than that of the preceding. It generally consists in attention to the wants of children, in tender caresses, &c.

III.

Organ of attachment and friendship.

Syn. Sense of the sympathies. Disposition to become attached to certain objects, to contract certain habits, and to follow certain pursuits. Principle of affection and sociability.

(*Adhesiveness.* Spurzheim.)

Situation. The seat of this organ is above and outside of that of maternity. Like it and that of amativeness, it is double, and forms a protuberance on each side of the head.

Natural history. Friendship is usually considered to be the result of a conformity in certain tastes, propensities, or dispositions of mind. Some even found it on motives of self-interest; but as it evidently exists between beings in whom these causes cannot be suspected of giving rise to it, this explanation must be abandoned, and it must be regarded as a primary, natural, and somewhat involuntary propensity, and as the origin not only of our love for our fellow-beings, but also of our attachment to all that is animate or inanimate, as well as the universal principle of all our *sympathies*.

But it must be observed, that this propensity amounts only to a general disposition to contract certain habits, and that the special attachment we may feel for any particular object, is connected with considerations dependent on other organs. This restriction, which, as I have before stated, is applicable to almost all the organs, prevents some very embarrassing contradictions, as the blind predilection of mothers for some of their children, and their dislike of others; the friendship of certain men, and their hatred of others, &c.

As the limits of this work will not permit me to enter into details on particular cases, I will merely observe that the various forms in which this propensity manifests itself in animals, may be reduced to the following: those animals, as crocodiles, panthers, &c., that live isolated and solitary, have no other attachment to each other than that induced by the instinct of reproduction; others, as doves, pigeons, &c., live in pairs, and are united for life, or merely during the season of love, and the education of their young. There are others that live in societies, all the members of which have a reciprocal affection for each other, but manifest no particular or individual attachment, as for example, horses, cattle, sheep, starlings, &c.; finally, there are others, as pigeons, crows, &c., which live in societies, but at the same time have strong individual attachments. Man belongs to this class, and hence forms communities connected by the most intimate relations, that are capable of existing between beings endowed with determinate propensities; and, if we advert to the bonds established by the joint influence of his intelligence and his natural impulses, we may obtain a just idea of the power that presides over the formation of human societies, and prevents their dissolution.

Gall was long uncertain respecting the organ of friendship; the manifestations of this quality are in fact so often equivocal, that it is difficult to pronounce on the reality of the sentiments which give rise to them. He, however, was witness of so many sacrifices made by individuals to serve their friends, and of so many proofs of disinterested friendship, that he was forced to admit the existence of this propensity. He often alluded to General Wurmser, who throughout life was a perfect model of friendship, and on whose cranium there was a remarkable developement of the organ in question. He also exhibited the cranium of a robber, who committed suicide, that he might screen his comrades from detection. The perseverance with which some dogs will follow their master, in spite of the most cruel usage, is also a striking proof of the force of this sentiment. Finally, every one must have felt or witnessed the severest struggles between the impulses of this propensity, and the necessity that often exists for not giving way to them.

Mimicry. When this organ is strongly excited, the head and body are slightly inclined to one side, and backwards; the ancients appear to have noticed this, as it is to be seen in the beautiful group of Castor and Pollux, which may be regarded as a model of the expression of the most tender friendship.

IV.

Instinct of defence of person and property.

Synon. Organ of courage. Propensity for strife and quarrels. Pugnacity. Disposition to cavil, quarrel, to enter into suits at law, &c. (*Combativeness.* SPURZHEIM.)

Situation. According to Gall, the heads of all quarrelsome persons are much larger and fuller immediately behind the ears, than in cowards.

Natural history. Gall was accustomed to state, that he often assembled all kinds of persons at his house, as hackney-coachmen, porters, &c. Among them, said he, were timid and pacific individuals, who sedulously avoided strifes and disputes, and on the other hand, bullies, whose chief pleasure appeared to consist in broils. In these latter, as in professed duellists and bravos, he always remarked the organ in question; he also found it in the bravest and most courageous soldiers, whilst it was constantly deficient in the pacific and cowardly. The ancients appear to have been aware of this circumstance, for they have represented all their gladiators with heads strongly developed in the region of this organ. Restive horses, savage dogs, &c., present the same developement, and differ from timid animals, in having their ears widely separated from each other, instead of being situated close together, as in the rabbit. At the same time, this kind of rash courage must not be confounded with that calm and determined bravery which is always allied with justice, which calculates on its powers of defence, and which, without seeking danger, never retreats from it. Gall compared, in his lectures, the cranium of General Wurmser, to that of the poet Alxinger, who was notoriously timid, and pointed out that the latter was flat, where the former presented a considerable protuberance; this propensity is sometimes much developed in females, and even in children.

Mimicry. In the action of this organ, the body is firm, the legs a little separated, the arms drawn backwards, the hands closed, and the eyes menacing. The coward, on the contrary, scratches his ear, as if to excite the organ.

V.

Carnivorous instinct.

Synon. Instinct to kill and destroy. Instinct to feed on flesh and blood. Sanguinary propensity. Cruelty. Barbarity. Propensity to commit murder. Instinct of destruction.

(*Destructiveness.* SPURZHEIM.)

Situation. In the temporo-parietal region, immediately above and behind the meatus, or opening of the ear, is to be found the protuberance indicating this organ.

Natural history. As may be supposed, Gall was extremely unwilling to acknowledge a propensity of this nature, especially in man. He was led to admit it for the following reasons. In comparing the skulls of carnivorous and herbivorous animals, he remarked, that in drawing a vertical line from the auditory openings, that the posterior portion of the brain was much larger in the former than in the latter. Some time afterwards, having examined the skulls of two assassins, and compared them with the craniums of other individuals, he was struck with the comparatively large size of the posterior portions of these heads, and spoke of an organ of murder; but he was soon convinced that he was in error, that in all probability nature had never intended to bestow such a propensity on man, that is, in the sense which we attach to the word murder. This denomination, therefore, appeared faulty, because in a state of nature, an animal kills only because he is formed to be nourished on flesh, and not with an intention to commit murder. It is true, that some species, as the ferret, weasel, &c., kill more than is absolutely necessary for their sustenance, and that in children an instinct for destruction is generally very active, although they prefer milk and vegetables to animal food.

But, these slight exceptions are readily accounted for by the circumstances that accompany them; and the rule remains true, and confirms the term *carnivorous* instinct, which I have adopted as characteristic. Moreover, it is to be remarked, that all animals (except the cat kind,) kill their prey in such a manner as to destroy its life in the most speedy manner, as if nature, in admitting this destruction, had wished it to be as prompt and as free from pain as possible.

But, does this propensity really exist in man, and can we admit that nature has created him with a bias to crime?

The number of his teeth, and their form, that of the stomach and intestines, do not permit a doubt that man is partly a carnivorous animal. Moreover, whilst most animals feed on but one kind of food, man satisfies his hunger on all kinds; and every species of animal, from the oyster to the elephant, are in turn sacrificed to satisfy his taste and appetite. Hence, it is clearly evident that man is carnivorous, and that he has a natural propensity to become sanguinary, and this may exist in all its stages, from a mere indifference to the sufferings of others, to an extreme pleasure in murder and destruction; that is, if I have clearly comprehended the views of Gall, that man may naturally have an aversion to bloodshed, but that this disposition, which corresponds to the minimum of action in the organ under consideration, increases as the organ is developed, and successively, but insensibly changes into insensibility or indifference, then into pleasure at the sight of blood, and, finally, in the most unrestrained desire to slay and destroy. Gall and Spurzheim, have given numerous and irrefragable examples in support of these general assertions. At the same time, if this propensity leads to murder, assassination, and arson, it may also, in many cases, be employed usefully, and become a virtue, as there are many objects which are relatively injurious, and ought to be destroyed. Spurzheim considers this propensity under the denomination of *destructiveness*, because it excites us to bite, scratch, break, tear, burn, devastate, drown, strangle, poison, assassinate, or, in other words, to *destroy*.

Mimicry. The mimicry of this organ closely resembles that of the preceding; the whole body is in a state of great tension, in unison with the internal sensations experienced by the individual. All the movements are rapid, and the eyes are sparkling and vivid.

VI.

Organ of cunning, cheating, and trickery.

Synon. Disposition to use unworthy means to discover the truth. Address in concealing the intent or purpose. Spirit of intrigue. Dissimulation. Falsehood.

(7. *Secretiveness*. SPURZHEIM.)

Situation. The organ of cunning is a little in front, and above that of destruction; it is of an oblong form, and gives a fulness above the temples.

Natural history. Gall remarked this organ for the first time, and very much developed, in a man overwhelmed with debts, but who was so adroit in his plans, that no one of his creditors knew of his being indebted to others; he used the greatest cunning in the various expedients he adopted, to prevent a discovery of his conduct. Spurzheim, on the contrary, is of opinion that cunning is an operation that requires a certain degree of intelligence, and refers the disposition of this individual to a peculiar aptitude to *hide* or *conceal.* I think that both these views are partially correct, and refer to the same primary instinct, an instinct that is indispensable to every being, as a means of safety and protection against the numerous dangers with which it is environed; in animals, it is more mechanical than in man, principally consisting in concealment; in the human race, it becomes an operation complicated with those of other organs, and depends, in a great degree, on the powers of the understanding. The dog hides a bone; the cat feigns sleep, to deceive her prey. Some animals also display much cunning and address in escaping from their pursuers, as the fox, &c. But man, when he wishes to deceive by assuming the guise of loyalty and frankness, also makes use of language calculated to veil his real intentions.

Mimicry. The actions of a wily man bear the impress of mystery; he moves with the stealthiness of a wolf, vigilantly observing all that passes around him, and designating the dupe he is about to make, by the attention and politeness he lavishes upon him.

VII.

Instinct for amassing riches, &c. Love of property.

Synon. Propensity for taking what does not belong to us. Coveting. Propensity to steal. Usury.

(8. *Acquisitiveness.* Spurzheim.)

Situation. This organ extends from that of cunning, to within a short distance of the outer edge of the super-orbitary ridge.

Natural history. Robbers are numerous, but what is the cause of the propensity to steal? Is it misery, ignorance, bad education, idleness, or absence of moral and religious principles? But, even among the rich—those who have received the best education, devotees, counts, countesses, princes—many individuals have manifested this propensity. A young man of an excellent family, not being able to resist a propensity to rob his relations and friends, entered the army, hoping that the strictness of military discipline would correct him of a vice he himself held in the greatest detestation, but it was in vain. He then studied theology, and became a capuchin; but it was to no purpose; he robbed in the barrack and in the cell, as he had done at home and at college; yet he was highly esteemed for his good qualities. Thousands of similar examples might be given, where the most careful education, and the most severe punishments, failed in subduing this propensity. Now, it has been proved that artificial habits do not gain so complete a mastery over the human mind, neither do they resist such active means of cure, as those alluded to above. We must, therefore, admit that a propensity may exist, which excites individuals to the commission of theft. Moreover, this propensity is found in animals also; wolves dispute with each other for the same prey; dogs hide the food that is given them; cats seize every opportunity of stealing food, &c.; hence, Gall was accustomed to reply to the objections urged against the existence of this organ—"of what avail is reasoning, in opposition to facts?" Again—the assertion of lawyers, that a propensity to steal cannot depend on a peculiar organization, as property is only the result of conventional legislation, falls to the ground, for Gall has shown that the assemblage of man in communities, is an institution of nature; and therefore it must be evident, that everything depending on this event, must arise from the physical organization of man. Hence, concludes he, the sentiment of *meum*, belongs to natural, as well as to artificial societies, but differs by being founded on force in the first, and on laws, in the second. Finally, this propensity, considered in the abstract, is a useful faculty, and the greater part of its abuses, as has been observed by Raynal, are the result of the erroneous principles on which the fabric of society is erected.

Mimicry. This is seen fully exemplified in the miser. In general, the head is inclined forwards, the arms stretched out, and the hands open, as if to receive, or half closed, as if to retain what may be given.

VIII.

Instinct presiding over a choice of habitation.

Synon. Instinct of height. Propensity inducing certain animals to live on the summit of mountains, certain birds to soar above the clouds, some to build their nests in the loftiest trees, and others in thickets, &c. Instinct of dwelling in particular places. Love of habitation.

(3. *Inhabitiveness.* SPURZHEIM.)

Situation. This organ is placed immediately above that of maternity, on the median line, and in the middle region of the back part of the head. It is the lower part of the organ of pride, as designated by Gall.

Natural history. The idea that pride, a desire of commanding, and a predilection for mountains, are parts of the same faculty, has always perplexed even the most zealous disciples of Gall. I have therefore determined to separate these two faculties, and do it the more willingly, since Gall never opposed this view of the subject, which was first taken by Spurzheim. Hence, I regard the lower part of the organ admitted by Gall, as the seat of the instinct to live on mountains; and upper portion, as that of pride. Spurzheim admits, that we have much to learn respecting these organs, from the difficulty that exists of making the proper comparisons between aquatic and terrestrial animals.

When the habits and manners of animals are examined, it leaves no doubt that nature has assigned a peculiar locality to each species. Some are evidently organized to live in plains; others on the margins of rivers; others in the deepest valleys; and others, again, on the summits of mountains. Some fish reside at the bottom of the water, whilst others are always found near the surface. The eagle and the owl, are other examples of the most opposite instincts. It has been pretended that a difference of organization, joined to the circumstance of a more plentiful supply of food in certain spots, would explain the propensity in question.

But, as I have already observed, neither external or internal wants, nor the forms of the organs, are capable of producing permanent and determinate instincts. The sensation of hunger, does nothing more than warn the animal of the want of food; but, there is nothing intellectual in it, and it is incapable of suggesting or providing means to satisfy this want. Moreover, animals which feed on the same substances, are found in the most dissimilar regions; thus, one species of rat lives in cellars, and another in granaries; the wild-goat and the chamois delight in the most lofty peaks, and yet their appropriate food occurs, in the greatest abundance, in less elevated situations. The faculty of flying does not explain the propensity of the eagle to soar, nor of the sky-lark to rise to a great height whilst singing; whilst the owl remains in his hole, and the nightingale pours forth his sweet notes from a low bush. It is therefore evident, that certain animals seek heights from pleasure, and to satisfy a propensity which can have no other seat than one of the convolutions of the brain. However, I shall treat of the organ of heights, as described by Gall.

Mimicry. Animals that live on heights are generally more active and agile than those living on plains, and often present marked peculiarities in their actions, and in their locomotive organs.

IX.

Love of power.

Synon. Spirit of domination. Propensity to command. Good opinion of self. Love of independence. Pride, haughtiness, arrogance, disdain, vanity, presumption, insolence.

(10. *Self-esteem.* SPURZHEIM.)

Situation. The seat of this instinct is on the median line, or middle of the head, a little below and behind the top of the head.

Natural history. Despisers of all authority, of sovereignty, of absolute power; leaders in rebellions, and revolts, &c., are generally proud and ambitious men. A want of energy or action in this organ, disposes to submission and slavery. I am fully aware, says Gall, that an inhabitant of a valley may possess as much pride as a mountaineer; but it is also true, that pride is more frequently met with in the inhabitants of elevated situations, and that they have a greater propensity to independence. It is also a fact, that proud children endeavour to make themselves appear taller, by rising on their toes, and climbing on chairs; that some men have the greatest pleasure in ascending heights; that small women are fond of high head-dresses, and high-heeled shoes. It is also true, that soldiers prefer high caps, and helmets surmounted with long plumes. So, also, the proud man has an erect carriage; kings are seated on thrones; those who wish to command, endeavour to place themselves on some elevated situation; all the expressions by which the different manifestations of pride are designated are based on those applicable to heights. Thus, we say an *elevated* station, *low extraction, &c.* These reasons, and many others of an analogous character, induced Gall to consider the love of elevated situations, and the feeling of pride, &c., as belonging to the same propensity.

Mimicry. This is so striking and unequivocal, that it cannot be mistaken. An individual under the influence of this passion, carries his head erect, his arms sometimes extended, as if to command; sometimes elevated, as if to proclaim his self-sufficiency, and contempt for others.

X.

Love of approbation.

Synon. Love of glory and distinction. Ambition. Vanity. Coquetry. Ostentation. Emulation. Jealousy. Desire to please.

(11. *Love of approbation.* SPURZHEIM.)

Situation. On each side of the preceding organ, these protuberances, when much developed, cause the head to appear very large behind.

Natural history. When this propensity is under the guidance of the superior organs, and is strongly manifested, it is ambition, love of glory, and enthusiasm in sublime pursuits. If, on the contrary, the superior organs are but slightly developed, and this propensity is at the same time predominant, it is vanity, ostentation, coquetry, &c.; in the man who strives to excel in his profession or calling, it is the love of approbation, applied to the ordinary pursuits of life; it is this sentiment of emulation that excites the general to victory; that urges the workman to bestow all possible finish and perfection on his work. A shoemaker, who has a pride in making good shoes, is a valuable member of society. Gall was much pleased that his gardener had vanity, because it excited him to make the greatest efforts to raise the best vegetables. That country is happy, where the vanity of women consists in being faithful to their husbands, and in overlooking their households! That government is happy, where the prince strives earnestly to merit the affection of his people! That nation is happy, where rewards are based on public esteem, and a merited reputation!

Finally, this propensity is the source of a multitude of brilliant actions, and heroic deeds. Parents and instructors, says Gall, cannot employ a more honourable or efficacious stimulus. But, it should be remembered, that its application to a determinate object, depends on the combination of other faculties with it.

Mimicry. The vain man turns his eyes from side to side, to see if his figure, and the elegance of his dress be admired. He uses many gestures, and always presents himself with an affected and self-sufficient air; but, this is still more striking in the coquette.

XI.

Circumspection.

Synon. Caution. Sedate, deliberate character. Disposition to calculate chances. Inquietude. Fear. Irresolution. Melancholy.

(12. *Cautiousness.* SPURZHEIM.)

Situation. This organ, like all those which are not situated on the median line, presents a double elevation, one on each side of the head, near the middle of the parietal bones, and forms a large protuberance behind that of cunning.

Natural history. Gall was led to think that irresolution, indecision, and circumspection, might depend on the developement of certain convolutions of the brain, by observations made on two individuals who were very remarkable for these qualities; one was a clergyman, of great sense and much wit, but who was so fearful of committing himself, that his conversation became exceedingly tiresome; he repeated the same thing over and over, as if to assure himself that it expressed his meaning in an exact manner. His conduct was in unison with his manner of speaking. The most insignificant undertaking, was subjected to the severest examination, and the most rigorous calculation. The other was a lawyer, who, by his extreme irresolution, obtained the surname of *Cacadubio.* Gall, on examining the heads of these two individuals, who in other respects were of wholly dissimilar characters, was struck with the prominence of the centre of each parietal bone. He subsequently found, that in cautious animals, as the stag, the deer, &c., and in those which station sentinels, as the chamois, the wild goose, &c., the head was much developed on each side. Being thus led to consider these dispositions as dependent on a primary propensity, he undertook to trace it in the various forms or manifestations in which it might present itself. He came to the conclusion, that society, viewed in reference to this faculty, presents two classes of individuals, differing widely from each other; the one, frivolous, heedless, rash, and thoughtless; the other, grave, calculating, and of a decided and cautious character. The first, says Gall, live for the present moment, are generally gay, abandon themselves to their feelings, and rush, without reflection, into the most hazardous enterprises. The second, on the contrary, live for the future, are continually on their guard, foresee all dangers, and seldom undertake anything, the result of which may be doubtful. The former often experience misfortune after misfortune, from their inadvertence and want of foresight. Thus, an individual of this character will pass hours in search of a key which he had mislaid or lost through carelessness. Another is thrown from his horse, and breaks a leg or an arm, from having imprudently attempted to gallop on a slippery pavement. The latter, on the contrary, are over-cautious, and are always quoting the adage, that in a hundred accidents, ninety-nine might have been avoided. A person thus constituted, trembles at the sight of a tumbler placed near the edge of a table, and never breaks anything. Another will be employed for days in trimming trees, without cutting himself.

Nevertheless, cautiousness, when carried too far, becomes the greatest enemy to our comfort and happiness. It is a sort of pathological state, which renders its victim a burden to himself and his friends; everything becomes a subject of fear and alarm, to such an individual. If he experiences the least reverse of fortune, he becomes a prey to the most overwhelming despair. If an epidemic disease makes its appearance, he fancies that he must inevitably be attacked by it, and suffers the greatest agony of mind. In short, no event occurs, that by any possibility may affect him unpleasantly, that does not plunge him into a state of anxiety and distress, rendering him at length so morose as to cause his own unhappiness, and that of all around him.

Mimicry. Circumspection is in general more developed in females than in the other sex, and in feeble and timid animals, than in those that are courageous. A cautious person carries his body erect, turns his head from side to side, and picks his steps with the greatest care.

XII.

Sense of things.

Synon. Memory of facts. Educability. Perfectibility. Curiosity. Docility. Disposition to perfect the action of the different organs. Rapid conception, extreme facility in appreciating things. General desire for instruction, and remarkable aptitude to acquire all branches of human knowledge. Decided talent for teaching. Disposition to adopt all reigning opinions, all new doctrines, and to model our habits and manners by the fashion of the day. Sense of moral relations. Organ which enables birds to become domesticated, and to receive a certain education.

(22. *Individuality.* 30. *Eventuality.* 25. *Weight.* SPURZHEIM.)

Situation. This organ forms a prominence which, commencing at the root of the nose, extends towards the middle of the forehead, becoming larger on each side of the median line between the eyebrows.

Natural history. Gall observes, that care must be taken not to confound, as has been too often the case, this general and indeterminate perfectibility, with the particular and determinate perfectibility of each primary faculty. There is no moral or intellectual quality, says he, which may not be exercised, and thus acquire greater power. But, this kind of perfectibility is always limited to a certain range. On the other hand, the educability in question, principally extends to things not comprised in the sphere of action of the particular forces.

Spurzheim has taken a different view of the subject from his master, and has divided the organ in question into two others, one of which he terms that of *individuality*, the other that of *eventuality.* According to him, ideas relating to the individual existence of external objects, belong to those faculties which are absolutely necessary. The inferior animals are even endowed with the power of acquiring them, and in all others, as in children, this faculty, which comprises almost everything which philosophers attribute to the sense of touch, is manifested at a very early period of their existence. When it is too active, it leads to the personification of everything, even phenomena, as motion, life, fever, &c. When too sluggish, it has led some philosophers to deny the existence of the world. The above observations apply to the organ of individuality, which occupies the space between the root of the nose, and the lower part of the organ of eventuality. But, Spurzheim observes, in another place, that we often meet with individuals who have a general acquaintance with all branches of human knowledge, who are interested in all that appertains to the sciences and arts, who, though not thoroughly versed in any one subject, know enough to speak with facility upon it, and, in fact, to speak well. In short, the organ of phenomena, or of educability, as described by Gall, is much developed in those persons who are the ornaments and delight of society, from their general acquaintance with every topic that may become the subject of discussion.

It is generally more developed in boys than in girls; in certain nations, than in others. This faculty takes cognizance of all that passes within and around us, renders us attentive to events and to historical facts, induces us to collect anecdotes, &c., and to take pleasure in relating them. With individuality, it forms a kind of practical knowledge which might be termed the philosophy of common sense, far superior to that aspiring philosophy which is founded on metaphysical subtleties.

Mimicry. The mimicry of this organ is not very sensible externally, it principally resides in a certain tension of the head, and a particular aptitude to scrutinize all phenomena that present themselves, and to investigate their results.

XIII.

Organ of localities, or of the relations of distances.

Synon. Love of travelling. Cosmopolism. Recollection of places. Emigration, or disposition to change place of abode, viz. country, city, house, or master. Propensity to vagabondry. Taste for foreign missions. Particular disposition to appreciate the properties of space, and to the study of geometry. Organ of cosmogony, or of local relations. Disposition to arrange things with taste, order, symmetry, and neatness. Aversion to disorder, confusion, and uncleanliness.

(21. *Locality*. 24. *Size*. SPURZHEIM.)

Situation. The seat of this disposition is a little above the eyebrows, and on each side of the median line.

Natural history. My taste for natural history, says Gall, often led me to make excursions for the purpose of procuring specimens; I was generally successful in these expeditions, from my knowledge of the habits and manners of the different species; but, if I returned to the woods and forests in a few days afterwards to visit my nets, or to obtain the birds' nests I had previously discovered, I almost always lost myself, notwithstanding all the pains I might have taken to mark the spots; this forced me to take one of my companions with me as a guide; this young man, although possessing but slender abilities, could always lead me to the desired place. When I demanded of him how it was that he never mistook his way, his constant reply was, that he could not understand how any one could lose themselves. I therefore took a cast of his head, and sought for other persons who were distinguished for the same faculty; this led, in a short time, to the discovery of this organ, which, however, must not be confounded with the prominences produced by the frontal sinuses. These are generally horizontal, and situated close to the eyebrows, whilst the two projections of the organ of locality extend in an oblique direction from the root of the nose to the middle of the forehead.

Some of the opponents of Gall have attempted to show that this faculty, so useful to man and animals, and especially those that migrate, depends on the sense of smell; but naturalists had long been aware of the impossibility of explaining this extraordinary phenomenon on such grounds, and had established a sixth sense to account for it. Cats, dogs, squirrels, rabbits, and honey-bees, return to their accustomed places of abode from great distances, and oftentimes by a different route. In the lemming, the developement of this organ would lead us to suppose that this propensity was irresistible, and such is the fact.

This quality, which has its abuses, like all others, is of the highest importance in many points of view; owing to it, we have cosmographers, astronomers, geographers, geometricians, landscape-painters, and navigators; to it, also the able general is indebted for the power of profiting by any advantages afforded by the nature of the country. Animals enjoying this faculty, appear to regulate their migrations by the rising and setting of the sun, the course of rivers, or the direction of certain periodical winds. Birds, generally rise to a great height in the air, before taking the route of their migration, after having, it is evident, previously settled all the circumstances of the voyage.

Gall was also led to regard this organ as giving rise to a love of symmetry and order; but, having subsequently remarked it in persons who were insensible to the greatest disorder and want of neatness, he suspended his judgment until he could make further observations. He, moreover, was of opinion that the love of order ought to be referred to a primary faculty, closely allied to the one under consideration. Spurzheim, without any more decided data, has admitted this faculty, which he thinks is situated between the organ of colours, and that of numbers.

Mimicry. A man who has lost his way, generally places the index finger on the organ, whilst he is considering what road he shall take. The situation of places is indicated by certain motions of the arms and hands.

XIV.

Faculty of preserving a recollection of persons, and of readily recognizing those we have previously seen.

Synon. Memory of persons, great facility in recollecting the prominent features and manners of individuals. Particular talent of seizing the forms of things, and a disposition to make collections of prints and portraits. Sense of prosopognosis.

(23. *Form.* SPURZHEIM.)

Situation. The eyes may be of any shape, but the internal angle being somewhat depressed, marks the presence of this faculty.

Natural history. Some persons have an astonishing facility in recollecting individuals whom they have seen but once, even after the lapse of many years; whilst on the other hand, others have scarcely a remembrance of those they are in the habit of constantly meeting from day to day. Some nations, as the Chinese, are very remarkable for this faculty. It is well known that bees, like all animals living in societies, can distinguish such as belong to their own hive, from those belonging to others. Elephants, horses, and dogs, become attached to certain persons, and recognize them after the lapse of long periods of time. Gall states that he himself was absolutely wanting in this faculty, so much so, indeed, as often to make the most embarrassing mistakes; nevertheless, his sight was excellent, and he was able to distinguish, even at a distance, such natural objects as he had studied. What is the basis of this faculty? According to Spurzheim, a facility in recognizing persons and things is not the essence of this force, as these may be distinguished by their size, figure, &c.; hence, this faculty is found in all individuals having a particular aptitude in seizing the forms of objects, as great painters, sculptors, crystallographers, &c., and leads us to represent even spiritual beings in a material form, but at the same time differs in its operations from individuality. Spurzheim, however, thinks that the two organs are situated close to each other, in the internal angle of the orbit of the eye.

Mimicry. When a person is striving to recollect the name of a person that he has forgotten, his eyes are thrown upwards; a tension is felt in the region of the organ, and in most cases he places his hand over his eyebrows, and rubs the lower part of his forehead, as if to stimulate the organ.

XV.

Great facility in retaining names and words.

Synon. Verbal memory. Sense of words. Disposition to talk. Loquacity. Faculty of artificial signs. Disposition to prefer such studies as require the recollection of a great number of names, as mineralogy, entomology, botany, numismatology, genealogy, &c. Organ of onomosophy.

(33. *Language.* SPURZHEIM.)

Situation. Large and prominent eyes, having the external commissure of the eyelids, and the ball itself turned somewhat downwards, indicate the faculty in question.

Natural history. The history of this faculty is interesting, it being the origin of all the discoveries made by Gall, and the cause of all his researches. Whilst still very young, and long before he had studied anatomy and physiology, he became convinced of the existence of such a quality; biographers, also, had noticed it in those whom they cited for their astonishing memories; but Gall was the first to discover that it was not a faculty depending on the action of the whole brain, as it is restrained to definite objects, and is often isolated and unsupported by any other dominant faculty.

According to Gall, it differs from philology, in being only an aptitude to remember words and names, without any reference to their logical or grammatical connexion. It makes man a walking dictionary, as it were, and is of great utility to the compiler, the actor, and to all those who have anything to do with nomenclature and terminology.

Spurzheim, on the contrary, considers this, and the succeeding organ, to be only portions of a single primary faculty. In his opinion, the aptitude to acquire a language is only a more perfect function of the faculty of verbal memory; and even Gall appears inclined to this view of the subject.

Mimicry. This is not very striking; like that of most of the intellectual faculties, it is calm, and almost internal. Nevertheless, if we observe an orator whilst speaking, and who is at a loss for a word, an external action will be evident in the region of this organ.

XVI.

Faculty of speech, and facility in the study of languages.

Synon. Faculty of speaking and articulating vocal sounds or words. Language of natural, artificial, conventional, or arbitrary signs, and power of expressing thought with precision and clearness, by means of these signs. Aptitude to seize the character and genius of languages, and their idiomatic terms and phrases. Faculty of appreciating the principal circumstances in the life of living beings, and of adopting certain signs to them, that they may be understood by others. Polyglotism.

(33. *Language.* SPURZHEIM.)

Situation. When the eyes are large and prominent, and at the same time pressed as it were towards the lower part of the orbit, it is a mark of a peculiar aptitude for the study of languages.

Natural history. All persons eminently endowed with this organization, as Baratier, Pic-de-la-Mirandole, Lewis Dufour, &c., have cultivated, at the same time, the living and dead languages, grammar, belles-lettres, philosophy, antiquities, history, medicine, jurisprudence, &c., and have, in short, acquired all the learning of their own, as well as of former ages. Leibnitz was the greatest mathematician, philosopher, historian, jurist, biographer, and antiquary of his time.

Gall came to the conclusion, from a number of pathological observations, that this conformation also produced the faculty of speech, or the power of articulating vocal sounds. He exhibited the cranium of a lunatic who was unable to articulate words, although he was not deficient in ideas, in whom the roofs of the orbits were very much arched, and consequently the organ in question very small. Children who are tardy in beginning to speak, appear to be in a like predicament; either the organ is too small, or it has been injured. At the same time, he confessed that there was much to be learnt respecting this organ and its faculties.

It appears, says Spurzheim, that this organ must be considered as composed of several parts; for some persons evidently have greater difficulty than others, in remembering or retaining certain classes of words. He cites several individuals, whose memory was deficient as regarded proper names, but was perfect with respect to adjectives and verbs. Hence, a distinction must be made between the power of forming ideas of things, that of attaching these ideas to natural or artificial signs, and the faculty of articulating these signs, or of speaking. The organ under consideration, appears to comprise in its sphere of action these three essential requisites of language, and to furnish a satisfactory solution of many questions much discussed by philosophers.

Mimicry. This, like that of the preceding organs, is essentially internal, and consists in a certain immobility of different parts of the body, and great tension of the organ.

XVII.

Sense of the relation of colours.

Synon. Faculty of appreciating colours and their shades, and of distinguishing them from each other. Knowledge of colours, and of their effects. Aptitude to judge of their harmony and contrasts. Talent constituting a colourist. Disposition to enjoy fine scenery. Innate taste for pictures, and richly decorated apartments. Sense of the chromatic.

(26. *Colour.* SPURZHEIM.)

Situation. The organ of this talent is situated in the forehead, immediately over the middle of the eye. When much developed, it causes a prominence of the external portion of the eyebrow.

Natural history. This organ has no connexion with the simple faculty of seeing, a sense possessed equally by man and animals, but its action is confined to much narrower limits—that of the appreciation of colours and their effects. Gall and Spurzheim, were acquainted with several individuals who were unable to distinguish certain colours, whilst on the contrary, there are others who are capable of appreciating the most delicate shades, and who have a particular tact in combining them in the most pleasing and agreeable manner. The application of this faculty to the arts renders certain persons extremely skilful in the choice and arrangement of colours, and in the decoration of apartments. It also produces great colourists, but does not necessarily make great painters, because the composition of a picture, and especially a historical one, depends upon other aptitudes, as conception of the subject, character of the figures represented, scene, &c.

Mimicry. The mimicry of this organ appears to be almost wholly referable to admiration. This, in fact, is the dominant feeling in viewing a beautiful valley, a romantic situation, a highly finished painting, or a richly decorated apartment.

XVIII.

Sense of the relations of sounds.

Synon. Talent for music, and aptitude to appreciate the musical concords and discords. Disposition to sing. Memory of tones. Sentiment of melody and harmony.

(*32. Melody.* SPURZHEIM.)

Situation. This organ is situated immediately above the outer angle of the eye, and when much developed causes a great enlargement of the lateral parts of the head, giving the forehead a square appearance.

Natural history. The perception of musical sounds is as little dependent on the sense of hearing, as that of colours on the sense of sight. An innate talent for each of these intellectual manifestations must therefore be necessarily admitted, or, in other words, a faculty that conceives musical tones, a memory that retains them, and an instinct that excites us to produce them. This faculty Gall has termed the organ of music. Spurzheim, however, considers that this science depends on two different faculties, that of sounds, and that of time; in fact, says he, some musicians play with great taste and feeling, though in very bad time, whilst others, although they execute with astonishing precision, are totally deficient in expression; be this as it may, there are so many proofs in favour of this organ, that it is impossible to deny its existence. At the same time, this faculty does not appear essential to the well being of man or animals, most of the species of the latter that are endowed with it, using it only whilst young, or during the pairing season; in man, both sexes have an equal aptitude for it, whilst in animals it is generally confined to the male.

It has been erroneously supposed that this organ would be found in a more or less developed state, in all persons that cultivate music; but, as this art is as much a part of education as grammar, history, &c., many continue to practise it from habit, and play or sing without any decided predilection for the pursuit. Literature, the chase, mathematics, music, &c., are all means of killing time, and occupying idle moments; we can soon distinguish, even among professed musicians, those who are born with a special vocation for this talent, and those who merely exercise it as a trade. It must, however, be admitted that music is always an agreeable occupation, and contributes greatly to the amelioration and civilization of the human race.

Mimicry. This is referable to measure and cadence; by it the experienced officer hastens or restrains the march of his troops, and excites them to the most heroic actions; by it, also, religion imparts hope and joy to the minds of her followers.

XIX.

Sense of the relations and properties of numbers.

Synon. Love of calculation. Algorism, talent for mathematics. Sense of time, organ of chronology, faculty of retaining dates and epochs.

(28. *Numeration.* 29. *Order.* 31. *Time.* SPURZHEIM.)

Situation. According to Gall, in all eminent mathematicians, the outer half of the super orbitary ridge is straight, or the angle of the eye projects beyond the anterior part of the temple. In either case, the eye is covered by the upper lid, near its external angle, and the developement of the organ gives it some obliquity.

Natural history. Gall had made great progress in his theory of the plurality of organs, when the son of a blacksmith called his attention to the faculty of numbers. This boy, who was scarcely nine years of age, was able, by mental combinations alone, to solve the most difficult questions in the four rules of arithmetic, much more correctly and rapidly than experienced calculators. Spurzheim states, that he has remarked that this faculty is much more developed in the English, than in the French, and other European nations, and still more than in negroes, who, according to him, use nothing but quinary calculators; that is, they count by fives, as we do by tens. I must here be permitted, for the first time, to differ from Gall; I admit, with him, that the faculty in question comprehends within its sphere of activity, everything that relates to numbers. But, I cannot bring myself to think that this faculty led Napier to the calculation of logarithms, Pythagoras to the demonstration of the square of the hypotheneuse, and Laplace to his great discoveries. Geometrical truths are independent of the properties of numbers, and the physico-mathematical sciences, which form the most fertile fields for the exercise of the human understanding, require at the same time a faculty of calculation; that of analogy, and a capacity to appreciate and combine the properties of space. However, a close examination of a great number of mathematicians, and of young men who excelled in their mathematical studies, does not permit me to entertain the slightest doubt of the existence of this organ.

Mimicry. During the action of this faculty, to which Gall also refers that of time, or a facility in retaining dates, all the others are absorbed as it were, and the individual becomes unconscious of what passes around him.

XX.

Sense of mechanics and construction.

Synon. Organ of the arts and industry. Aptitude to succeed in drawing, sculpture, and architecture. Talent which tends to great skill and perfection in manipulations of all kinds. Dexterity.

(9. *Constructiveness.* SPURZHEIM.)

Situation. The external sign of this organ is a rounded prominence situated in the temporal region, sometimes on a line with the eye, and sometimes a little higher, according to the developement of the neighbouring organs.

Natural history. It was a long time before

Gall could convince himself that our primary faculties depended on the peculiar organization of our brain; he had early remarked, that in able mechanicians, the diameter of the head from one temple to the other, was greater than that drawn between the zigomatic processes, but was at a loss to account for this peculiarity; finally, however, he met with two individuals, in whom the faculty and the organ were so striking, as to convince him of their mutual connexion. This discovery shed much light on his theory, and his subsequent researches were conducted in a much more exact manner. He perceived that this instinct was independent of all the others, that it was calculated to fulfil the wants of the animal, and, according to the nature of the external objects, proper for this purpose; finally, the examination of the various modes of construction practised by animals convinced him that their real wants never exceed the forces fitted to satisfy these wants, and that their organization always gives rise to instincts which are useful to them, and provides means to reduce these instincts to actions. He also comprehended why it was that these instincts were so limited, and, as it were, blind in most races of animals.

Some persons, says Spurzheim, have attempted to ridicule the idea, that the same faculty presides over the erection of the palaces and temples of civilized nations, and the obscure habitation of the mole, but are not the same instruments employed to produce the slow motions of the sloth, and the rapid bounds of the stag; to elicit the croak of the frog, and the harmonious notes of a Crescentini? We must therefore admit, that the differences of construction we remark in the nests of birds, &c., as well as the various degrees of perfection and finish in the works of artists, are dependent on different degrees of this faculty, which is equally necessary to the draughtsman, the sculptor, the engraver, the watchmaker, &c.; in fact, it is indispensable to succeed in the arts. It gives rise to the playthings of children, and the ever varying fashions of the gay world; to instruments of warfare, and the most useful machinery; to the evolutions of a ship, and the mechanism of the universe.

Mimicry. This is complicated, being both internal and external. Some idea may be formed of it by observing a sculptor at work on a statue, or a milliner trimming a bonnet, and imagining a new form or fashion.

XXI.

Comparative sagacity.

Synon. Quickness of apprehension, comparative perspicuity, particular aptitude to express an idea by an ingenious and striking comparison. Faculty of making comparisons, of finding analogies, of seizing the resemblances or dissimilitudes between objects. Disposition to use sensible images in speaking or writing. Popular eloquence. Tendency to employ metaphors, parables, and comparisons. Fondness for proverbs, adages, and quotations. Source of mythology, allegory, and apologues.

(34. *Comparison.* SPURZHEIM.)

Situation. A protuberance commencing at the upper part of the forehead, and descending in a conical form to about the middle of this part, announces the faculty in question.

Natural history. All the faculties hitherto spoken of, are common to man and animals, with this difference; that in the former some are eminently intellectual, and produce much more striking results. Those that remain to be treated on, appear to constitute, in an essential manner, his superiority over all other created beings, and are placed in that region of the head termed the forehead; hence, this part is much developed in him, especially in men of great intelligence, whilst on the contrary it is depressed, or totally wanting in animals.

The faculty under consideration commences this new series of organs, and forms the barrier between animality and humanity. Hitherto, we have studied only the animal part of man, and now proceed to the consideration of his more noble and moral attributes. Individuals endowed with the faculty in question, generally judge correctly of the relations of things, circumstances, and events, and are well calculated to lead and govern; their essential characteristic is a particular aptitude to present their ideas in a tangible form, or to embody their thoughts in a series of striking images. In this point of view, the faculty is of the utmost importance to poets, as their object is to paint their thoughts in the most glowing colours; it also leads children to prefer fables to any other kind of narration. This is found in all mother languages which abound in similes and hieroglyphics. Finally, it must also be regarded as the source of mythology, allegory, and apologue, whence it evidently follows that it has greatly contributed to the education of the human race.

Mimicry. Attention is the principal form of mimicry of this organ; this varies according to the degree of meditation it produces; the arms are often crossed over the breast, the eyes fixed on some object, and the frontal region is in a certain degree of tension.

XXII.

Depth of mind.

Synon. Metaphysical penetration, reason of things, spirit of observation, desire of knowing things, and the conditions of their existence; tendency to investigate the relation of cause and effect; faculty of abstraction and of generalization; mania for explaining everything, and for referring everything to first causes; propensity to idealism. (Metaphysics, ideology.)

(35. *Causality.* SPURZHEIM.)

Situation. This organ is formed of two prominences, placed on the same horizontal line, one on each side of the preceding organ, and of which they sometimes appear to be a continuation.

Natural history. It is certain that nothing in nature is isolated; that in all the series of phenomena she presents, the events succeed each other in an invariable order, and hence we are forced to consider some as causes, and some as effects. It is also certain that all mankind possess a more or less vivid desire to know the reason, the why and the wherefore of these phenomena; and it is still more certain, that we can only arrive at this by observation and experience, and by investigating the relations existing between those that present themselves as antecedents, and those we are led to view as consequences; this is precisely the object of the faculty in question; when it has a medium degree of developement, it evidently exercises the happiest influence on our education, and contributes, in an essential manner, to the certainty and reality of our knowledge. When too energetic, it induces aberrations of mind prejudicial to the human race, and which it is requisite should be properly studied. Although the concatenation just alluded to naturally leads us to the idea of a first cause, it is nevertheless certain, that a knowledge of this cause is beyond the sphere of our intelligence, and that our constitution or organization permits us only by observation and experience, to attain a knowledge of secondary causes; and this is the point attained by those individuals whose efforts and labours were under a wise guidance, and were devoted to the positive sciences, as natural history, physics, chemistry, mathematics, astronomy, mechanics, &c., which form the most solid part of the intellectual edifice.

But, there are other individuals, who, commencing with this hypothesis of a first and supernatural cause, whose essence is consequently unknown, have dared, as is observed by Spurzheim, to divine all the consequences, and to construct, as it were, a world of their own, instead of endeavouring to understand that which exists. This plan of procedure has created a host of ideal beings, and inundated human learning with the most fatal errors; has given rise to all the absurd systems of cosmogony, theogony, and mythology, as well as the equally vain sciences of ontology, theology, psychology, ideology, and, in short, to metaphysics and all its reveries.

Mimicry. Like that of all the intellectual faculties, it is calm; it consists in an almost perfect immobility of the body and limbs, succeeded by an elevation of the eyes.

XXIII.

Talent for wit and repartee.

Synon. Organ of wit, aptitude to view persons and things in a pleasant point of view, gaiety of character and love of laughter, disposition to ridicule everything, propensity for satire and epigram.

(19. *Gaiety or wit.* SPURZHEIM.)

Situation. This disposition is indicated by a double prominence, or, as must always be understood, two convolutions, one on each side of the last described organ.

Natural history. This faculty, which has no appropriate designation in the French language, causes us to view all objects in a pleasant manner, and constitutes what is termed *humour*, *cheerfulness*, and sometimes that natural repartee so peculiar to the French. Its essence is gaiety; it delights in fun and frolic; puns, caricatures, jests, raillery, irony, ridicule, pleasantry, buffoonery, and satire, all appertain to it. In some persons it is accompanied with a certain simplicity or candour, and consists in *bon-mots* without malice or bitterness, and goodnatured raillery, that never offends; in others, it is always offensive and pitiless; thus, the caustic Aristophanes, did not spare even his own family. In Horace, the gayest and most witty philosopher at the court of Augustus, it was always exercised with delicacy. Juvenal, on the contrary, attacked both friend and foe, and may be truly said to have perpetually irritated the wounds inflicted by himself. Henry IV., has been accused of having constantly wounded those around him, by ill-timed and bitter, though witty remarks, in the midst of the reverses of fortune he underwent before he ascended the throne.

Mimicry. This consists in imitating the gestures and attitudes of others, with the intention of making them ridiculous. It appears to be the best corrective of our whims, and to be well adapted to repress an inordinate self-love and vanity.

XXIV.

Philosophical talent.

Synon. Organ of inductive observation, spirit of induction, aptitude to perceive the relation of things, disposition to acquire a highly matured mind, faculty of appreciating the general laws of nature, and of deducing their results. Human reason.

(35. *Causality.* SPURZHEIM.)

Situation. This faculty appears to be rather the result of a simultaneous developement of the whole of the anterior and superior organs, than that of any special one. It is, in other words, a collective organ, which results from a happy concurrence of the superior faculties.

Natural history. After what I have already said, and the synonymy just given, it is needless to say much respecting this faculty. The organs alluded to, though eminently intellectual, and in the highest state of developement, can only afford isolated and partial notions of the different objects coming within the sphere of their action; but we sometimes, says Gall, meet with individuals who present a collective and simultaneous developement of all anterior and superior organs, and hence are endowed with the maximum of intelligence of which human nature is capable. Persons gifted with this happy organization, manifest the faculty of induction in an astonishing degree, are capable of generalizing all facts coming under their notice, and can discover the most abstract and hidden relations existing among created beings. Such, according to Gall, must have been the organization of those universal geniuses who have been the true preceptors of the human race, and who have long been designated by the name of sages and philosophers.

Mimicry. Independent of the immobility of the body and the tension of the head, a suspended respiration announces the intellectual effort required to seize the vast chain that connects all natural phenomena.

XXV.

Organ of poetry.

Synon. Poetic talent, brilliant imagination, faculty inducing a certain excitement or exaltation in viewing the beauties of nature, causing a taste for the sublime, and inspiring such a degree of enthusiasm as impels us to clothe our thoughts in the most harmonious language, and to paint them in the most glowing colours. Sense of the beau-ideal; aptitude to view things in a certain manner; correct and delicate ear and talent for expressing ideas and thoughts as if by inspiration, and in the most harmonious manner; talent for reciting poetry with grace and feeling.

(20. *Ideality.* Spurzheim.)

Situation. The organ of this faculty, which is among the most imperious, is placed in the upper and lateral part of the head, a little above the temple.

Natural history. For a long time, Gall considered this faculty as the result of the action of several of the more energetic organs. Although he was aware that this talent was not to be acquired by study, he nevertheless was not disposed to believe that the excitement or exaltation by which it is always manifested, was the product of a particular organ. Like the rest of the world, he thought that a sound judgment, a pure taste, a faculty of using striking and well selected metaphors, an ardent and fruitful imagination, great enthusiasm and invention, were the principal elements constituting a poet, and that these elements appeared rather the result of several intellectual faculties, than the product of a single organ. This opinion, says he, must be relinquished, as more ample experience and observation have proved its fallacy. In his great work, he gives many examples in corroboration of this, proving the coincidence of the faculty with the existence of the organ.

I will merely add, that poetry is so inherent to the human species, that man was a poet, long before he was an historian or a philosopher. In the earlier ages, poetry formed the principal source of pleasure to mankind. The first priests, the first philosophers, and the first legislators, delivered all their maxims and laws in verse; the Hebrews added the use of musical instruments, and the Greeks employed it to celebrate the power and deeds of their heroes and gods. In all nations, poetry is one of the first faculties of mind that arrives at perfection. Gall admits of poems in prose, as the essence of this kind of composition does not depend on either measure or rhythm. No doubt these augment the charm of versification, as a compliance with the rules of art contributes to its polish and harmony; but, true poetic genius is independent of all education or cultivation, is of spontaneous origin, and embraces all nature within its sphere of action.

Mimicry. If we observe a poet whilst composing, he will be seen, when much excited by his subject, sometimes to raise his head towards heaven, as if to invoke its aid, and sometimes to place his hand on the organ under consideration, as if to excite its action.

XXVI.

Moral sense.

Synon. Notions of justice and injustice; principle of honesty, conscience, goodness, mildness, pity, humanity, good nature, benevolence, compassion, sensibility, benignity, hospitality, beneficence, clemency, equity; disposition to do good, and to avoid evil.

(13. *Benevolence.* SPURZHEIM.)

Situation. These dispositions are owing to the developement of the convolutions placed on the median line on the superior anterior part of the head, just above the forehead.

Natural history. Is man born with a disposition to good or evil? This question, so often agitated among philosophers, is, as might be supposed, still undecided, because, like all those relating to the constitution of man, it cannot be solved by metaphysical generalities and considerations; it is equally evident, that the historical facts which are so often brought forward, shed no light on the subject, since they equally support both sides of the question. We must, therefore, recur to the organization, and make more precise researches.

Gall constantly remarked this disposition in such individuals as presented a prominence or enlargement about the middle of the superior anterior part of the forehead. He also remarked the same enlargement in all timid and pacific animals, whilst on the other hand, the heads of men remarkable for their cruelty, and ferocious animals, always presented a more or less considerable depression at this place. He was accustomed, during his lectures, to exhibit a great number of heads of men, dogs, horses, wolves, &c., in support of this assertion. He has remarked the same differences of organization in all families where there were many children, among whom some had an excellent heart, whilst others were naturally cruel and perfidious. Hence, he entertained no doubt of the existence of this organ.

Mimicry. We cannot deny that acts of the most atrocious cruelty are too often committed, though those of a contrary character are most common. In general, man is naturally good, and benevolent actions are among the first manifestations of a people that are happy and contented.

XXVII.

Faculty of imitating the actions of others.

Synon. Mimicry, pantomime, or faculty of imitating the gestures, manners, appearance, voice, and other characteristics of individuality. Particular disposition to succeed in drawing, in theatrical representations, and to give life and expression to the productions of the fine arts. Faculty of personifying ideas and sentiments, and of expressing them by gestures, attitudes, &c.

(21. *Imitation.* Spurzheim.)

Situation. A protuberance which is sometimes of a rounded form, and at others elongated, placed somewhat behind and on one side of that of benevolence, is the external sign of this disposition.

Natural history. Gall discovered the organization in question in all great actors that came under his notice; he also remarked, that in general it was more active in children than in adults, and that it was one of the principal means by which they acquired knowledge on a great number of subjects. It is also very marked in several species of animals, and more especially in monkeys and apes; when joined to wit, it contributes in a high degree to the pleasures and amusements of mankind; combined with poetry, it renders a poet eminently dramatic; with eloquence, it gives more expression to the passions of the actor; finally, it is capable of the greatest perfection and influence, when accompanied with a corresponding developement of the superior faculties.

Mimicry. As I before observed, pantomime must not be confounded with mimicry; the latter consists in the natural expression of our feelings and faculties by various gestures and attitudes. Pantomime, on the contrary, is an imitation of the gestures and attitudes of others.

XXVIII.

Love of the marvellous, and of supernatural objects.

Synon. Organization that disposes us to see visions, and to believe in inspirations, presentiments, phantoms, demons, ghosts, magic, sorcery, enchantments, apparitions, presages, astrology, familiar spirits, good and evil genii, supernatural revelations, &c.

(18. *Marvellousness.* Spurzheim.)

Situation. A convolution of the brain, situated between those constituting the talent for poetry and propensity to imitation, appears to be the cause of these dispositions.

Natural history. Savage tribes, like civilized nations, have their traditions and their fables, which they collect and carefully preserve; every people has had its sibyls, its augurs, its priests, and its soothsayers. One consulted the flight of birds, the other the heart of victims, &c. It is indisputable that many men, even of the highest attainments, have believed in visions and ghosts; others have entertained a conviction that they were inspired, and had a particular mission to fulfil. Socrates, Tasso, and Ignatius Loyola, are examples of this. Can we regard such men as fools or impostors? According to Gall, this disposition, which loves all that is astonishing, surprising, mysterious, or miraculous, is the immediate result of a particular organization; and it would be as unjust to accuse those endowed with it of imposture, as it would to censure poets for embodying and personifying their ideas. Such individuals are slaves of too energetic an action of one part of the brain, as poets are of another. But, what views had nature in the creation of this organ? Spurzheim thinks that it contributes to strengthen our faith, and to fortify our belief. At the same time, it cannot be denied, that many persons have abused this disposition, or simulated it to attain certain objects; others have been firmly persuaded that they were selected to be the bearers of revelations of the highest importance to mankind. It has pleased the Lord, says Swedenborg, to manifest himself to me, and to place me in communication with angels and spirits. Joan of Arc declared that St. Michael appeared to her, surrounded by a brilliant light, and announced to her that God ordered her to undertake the deliverance of the king, &c.

Mimicry. During the action of this organ, the movements vary according to the subject of the vision. If the object is sacred, the countenance of the visionary presents an expression of inspiration and reverence; if it relate to some horrible crime, his expression is that of fear and terror.

XXIX.

Organ of theosophy.

Synon. Belief in the existence of God; idea of a Supreme Being; propensity towards religious worship; devotion, piety, love of God, worship of God alone; idolatry, worship of saints; respect for sacred things.

(14. *Veneration.* 16. *Consciousness.* 17. *Hope.* Spurzheim.)

Situation. A prominence on the median line occupying the summit of the head, is the organic and innate source of all belief.

Natural history. It has been asserted, that contemplation of the phenomena of nature would naturally lead mankind to the idea of a supernatural and omnipotent first cause. On the other hand, the existence of such a being has been denied, and considered as a mere artifice devised by rulers to govern their subjects. The fact is, that our ideas on all subjects depend on our being furnished with organs to originate, or to give birth to them. We have the idea of a Supreme Being, as we have love of offspring, benevolence, &c., because we have an organ fitted for such a purpose. Without an organ of theosophy, we could have had no communication with the Supreme Being, nor should we have had a conception of his powers and attributes. That such is the fact, is shown by this idea being totally wanting in all animals, whilst it is found in the most degraded and savage nations, and, as is observed by Plutarch, there is no city or village that has not its god, or in which the inhabitants do not pride themselves in having had a mysterious or supernatural origin; this certainly would not be the case, if a sentiment of the existence of the Divinity was not innate, and inherent to our natures;

but, at the same time, there is a great difference between this sentiment, and the revelations, dogmas, mysteries, &c., of different religious sects. There is no doubt it leads to a religious belief, but does not afford the means of distinguishing what is true, from the mass of superstition, error, and mystery, with which designing men have surrounded it.

One of my brothers, says Gall, who was destined by my father for commercial pursuits, manifested a decided propensity for religion, from his earliest years. His playthings were imitations of sacred vessels, and clerical dresses; he prayed, and celebrated mass all day; and, at twenty-three years of age, left his family, and turned hermit. Gall also remarked, in his youth, that some of his companions had no capacity for religious instruction, whilst others received it with the greatest eagerness. Afterwards, like Lavater, he was struck with the circumstance, that persons distinguished for their piety, were almost always bald, and that their head was very prominent at the top; finally, he made a sufficient number of observations to convince himself that religious feelings depended on conformation. He also remarked, that, among the ancients, artists always represented their high priests, and other ministers of religion, with this conformation of head, and that all modern painters have adopted it in their representations of Christ.

How has it happened that this sublime disposition, evidently inherent to the nature of man, and so consoling to humanity, has been so degraded in all ages, and among all nations? From the superstitious follies of the Egyptians, to the human sacrifices of the Gauls, it has been the source of every extravagance and atrocity. Has a religion ever existed, that has not been the cause of bloodshed and crime, that has not assumed the utmost arrogance, and maintained the most absurd tenets? When will mankind be enlightened on the abuse of their faculties?

Spurzheim, considering that it has been proved that men may profess the most austere piety to propitiate the Divinity, without, at the same time, possessing any brotherly love or benevolence, and even without acting according to the dictates of justice; that nothing is more common than to see devotees who pray from morning to night, and impose the severest penances and mortifications on themselves, and yet who are at the same time egotists, and inclined to deceive their fellow-citizens; thinks that sectarian faith and practice should not be considered as identical with morality, and a sense of right and wrong; he therefore regards veneration as the essence of the organ of theosophy, from which he separates those of conscientiousness and hope.

Mimicry. As the organ of theosophy is also that of veneration, its mimicry varies according to these two circumstances. In devotion, all parts of the body are directed towards heaven; in veneration, on the contrary, they are inclined towards the earth.

XXX.

Firmness of character.

Synon. Disposition to bear up against adversity, to brave menaces and danger, and to be unalterable in our resolutions. Propensity to independence, constancy, perseverance, firmness of character. Proneness to become obstinate, disobedient, headstrong, seditious, &c.

(15. *Firmness.* SPURZHEIM.)

Situation. These dispositions depend on a protuberance situated at the top of the head, on a line with and behind that of theosophy.

Natural history. "One person," says Gall, "may be vacillating and changeable, another firm and obstinate. This flies from project to project, that steadily pursues the same career. One child may be self-willed and headstrong; another docile and obedient. Such is the nature of man; his character and his conduct through life depending more on his feelings than on his reason. Cicero was always vacillating from party to party, and inconsistent in all his opinions and measures; whilst Cato, on the contrary, even during childhood, manifested the most inflexible firmness of character. Some individuals are incapable of undertaking or of succeeding in anything; others will surmount every obstacle, and succeed in the most difficult enterprises. To what is this quality owing? It is evident that it often takes place without study or reflection; and moreover, its application to different objects depends on other faculties with which it may be combined. With benevolence and justice, it forms an upright judge impervious to every seduction. With pride and ambition it forms bold and designing men, who are impatient of all rule, and who are born to command, &c.

Mimicry. If we observe a man forming a firm resolution to pursue an object at all hazards, he will be seen to assume a certain rigidity of body, as if to bear up against all opposition.

APPENDIX

I INTENDED to have touched on several philosophical questions demonstrating the superiority of the intellectual and moral physiology of man. But the limits I have assigned to this work, oblige me to omit a majority of them. To complete what I have said, however, I will make a few observations on free-will, and give short explanations of the plates necessary to elucidation of the text of the work.

I.

Free-will.

The doctrine of fatalism is as destructive of free-will as that of materialism is of a belief in the spirituality of the soul. By this word is meant, that all events are the effects of *chance.* "In this sense," says Gall, "my doctrine contains nothing that is obnoxious to censure; but if it be pretended that the universe is regulated by immutable laws, derived from a supreme intelligence, then the condition of the material organs, over which man has no control, and which are subject to the immutable laws imposed by the Creator on natural and created beings, evidently destroys all pretence to liberty. Our actions, like all other events, would only be the consequences of an absolute necessity, and not the results of a will capable of choice; hence, the salutary restraints of rewards and punishments, so necessary in directing and curbing our desires, would become nugatory." But Gall replies with Tracy and other philosophers, that all our motives are under the influence of a multitude of causes which are not less contrary to liberty than the condition of our material organs; that they are the necessary results of our organization; that we are as unable to avoid feeling the animal passion, anger, jealousy, &c., as of not experiencing hunger, thirst, &c.; that we are even incapable of modifying our perceptions in any way, or of avoiding a perception of the actual relation of objects; that our thoughts do not depend on our will, since we can hear and see only by the material organs bestowed on us for that purpose; that things appear to us large or small, good or bad, true or false, not according to any fancy or will of our own, but from certain fixed and determinate conditions over which we have no control; and, finally, that all nations have been so fully convinced of these truths, and of the decided influence of different causes, as age, sex, soil, climate, &c. on our sensations, ideas, and actions, that is, on our liberty, that they have all mingled a kind of predestination, more or less verging on fatalism, with their laws and religious tenets.

What then are we to understand by the free-will recognized by moralists, philosophers, legislators, and fathers of the church? Very different things. In fact, some have accorded to man an *unlimited liberty*, which is evidently chimerical, since man has no unlimited power either over himself or over surrounding objects. Others have spoken of an *absolute liberty*, that is independent of all causes. But as by this hypothesis, the actions of mankind would be without motives, as nothing could act on him, everything would be regulated by caprice, and all certainty and justice would be destroyed; it is hence evident that such liberty is also chimerical. A third class of philosophers have attempted to establish free-will on the conscience we have of being able to choose between things; whence has arisen a third sort of liberty, which has been termed *illusory*, because the satisfaction we experience is not the effect of this liberty, but arises from the fulfilment of our desires. We are moreover continually under the dominion of a host of prejudices and wants, which induce us to pursue certain steps, and yet we are persuaded that we are acting with perfect freedom, and never discover our error till it is too late. Then we say: we were misled by passion. Hence, the momentary satisfaction we experience is illusory. Finally, during the whole course of our life we attribute the justice of our decisions, the purity of our manners, and the morality of our conduct, to the effects of our will guided by our reason, and hence pride ourselves on our liberty. But let the object, which we have determined to avoid, excite our organs, and the result is that we are no longer masters of our actions. In what does this *liberty* consist, this liberty so much talked about, and the moral power of which is said to constitute all the dignity of human nature.

II.

Moral liberty.

According to Gall, we ought not and cannot admit any other liberty except such as is in accordance with the general laws of nature and the constitution of man. By this sort of liberty our actions are the complicated result of all the causes capable of acting upon us, either internally or externally, or in any way influencing our will. Such a liberty does not consist in destroying what is innate in us, but depends on the double faculty of *being determined and of determining by certain motives.* It is of importance to avoid the great error committed by so many philosophers, of confounding the *propensities* and *desires* with the *will,* and of admitting no difference between *willing* and *desiring* ; or, as expressed by others, between the simple tendency to act from a stimulus or excitement, and the intellectual act which examines and decides if there is a necessity for action, which wills to act or not to act. "As the existence of the wants arising from our conformation," says Condillac, "do not depend upon ourselves, so likewise our actions to supply these wants are independent of our control!"—"It is not here," says Cousin, "that we are to look for liberty." According to Gall, every desire, every propensity, results from the action of a single organ; "the will, on the contrary, is a decision produced by the examination and comparison of several motives; that is, as I have already stated, the result of several forces, acting in different ways." It is curious to follow, even in the treatise of the learned doctor, the explanation he gives of the different degrees of extension acquired by the will in different species of animals, according as they are endowed with organs appertaining to the more noble and elevated faculties. With Cousin, Destut Tracy, and Condillac, he admits that the action of one organ cannot destroy the impression received by another, nor the action which is the necessary result of this impression; but he pretends that as the number of the organs is increased, the individual becomes susceptible of a greater number of sensations and ideas,—is also endowed with greater power and stronger motives to avoid a blind subjection to his desires or propensities; hence a struggle takes place between his inferior and superior faculties; and according to developement and education of these latter is their dominion over the animal propensities.

In the inferior animals, in which the number of organs is very restricted, liberty is only a simple spontaneity, caused by the irritation of one of these organs; in man, on the contrary, with whom the plurality of organs is at a maximum, the excitation is experienced in several of them at the same moment, and hence a balance or equipoise is established that modifies the awakened propensities, calls the reasoning powers into play, strengthens the will and gives it power to resist. If, for example, the sanguinary instinct impels to murder; benevolence and theosophy, being equally excited, attract the attention of the mind to other objects, and oppose the conversion of this propensity into an act. The same is true as regards all the other animal qualities,—their exercise is always modified by the action of the superior faculties. Hence in man these faculties and their cultivation, joined to other causes, derived from education, the laws, religion, &c. constitute a dominant force, which scrutinizes, compares and weighs the motives of his actions and impresses on them a certain degree of *morality;* it is evident, however, from what has been said, that he alone is not responsible for his actions, since the choice of his organs and their developement did not depend on himself; that he was not enabled to cultivate them, or of bestowing such an education on himself as would regulate them; that he is unable to foresee what influence the laws, religion, or the prejudices of society will exercise on him; that it did not depend on himself whether he was born intelligent or an idiot, of a mild character or of an impetuous temper; that he has no mode of combating the general laws of nature, or a multitude of social causes, which impel him to or restrain from certain acts. Finally, as all these causes tend to complicate the exercise of free-will, he can only be responsible for such of his actions, as are really under his control, and not for such as are rendered independent of his will by foreign causes. "Such," says Gall, "are the conditions and restrictions, under which man may be free in this world," and this is the liberty he terms *moral liberty*.

III.

Good and evil.

The exercise of free-will supposes the existence of good and evil; for, what would be the service of a faculty of choice, if everything was equally good or equally evil, and would conduce to the same end? It supposes also that the being who is to choose, knows the nature of the things which may or may not conduce to this end; for otherwise he might make a bad choice, without its being imputed to him as a crime. It may readily be conceived that these circumstances greatly embarrass the celebrated question of free-will; and the solution that a man like Gall should give of it, in a system as original and profound as his, is well calculated to excite our curiosity. "I have been censured," says he, with some bitterness, "for admitting the existence of innate inclinations to evil, and propensities to crime. But the Lord himself has said: (Gen. chap. vi., verse 5.) 'That the wickedness of man was great in the earth, and that every imagination of the thoughts of his heart was only evil continually.' " This answer ought, undoubtedly, to satisfy his greatest enemies; but a philosopher may desire something more.

As it is repugnant to a virtuous man, says Leibnitz, to imagine that a being infinitely good can be the author of evil, of all the crimes and all disorders observable in society, philosophers in all ages have endeavoured to explain this contradiction; some have admitted two principles, the one good, and the other evil, considering them severally, as the origin of good and evil; others maintain that our qualities were originally good, and our abuse of them is the only cause of all the evils which afflict us; others again consider, that not understanding the infinite design of creation, we exaggerate the evil which exists, and attribute it improperly to matter; finally, a fourth description of philosophers have endeavoured to explain evil by the free-will. But as no one of these hypotheses could bear the scrutiny of close reasoning, Gall abandoned them all in order to approach the doctrine upheld by the fathers of the church, viz., that man is naturally inclined to all sorts of perverse actions; not only because God tolerates them, but because the possibility of such actions really enters into the plan of divine Providence, which appears to admit of no true virtue without a struggle. He says, that we may well envy the fate of him who does no evil, because nothing excites him to it; but in order to claim the merit of virtue, we must triumph over our propensities. Gall then, on the origin of evil, has no other ideas than those of the founders of Christianity, and of the most celebrated sages of antiquity; like them, he admits of evil propensities, so inherent to human nature, that neither education, religion, nor the gallows have yet been able to extirpate them from society, although they were not there originally, but produced by the liberty we enjoy of abusing our faculties. In his system, this abuse is explained, like a great many other difficulties, in the simplest manner, and by the different degrees of developement which the organs may acquire; thus the depression of the propensity for reproduction, causes indifference and even aversion to the sex; a too great developement, on the contrary, leads to vices and horrible excesses; whence may be adduced, that an useful and necessary faculty becomes, by accidental circumstances, a source of pernicious inclination; in the same manner, however important may be the faculty of philogenesis, if too weak, it predisposes to a certain aversion for children, and even to infanticide; whilst its excessive developement leads to that blind indulgence which produces so many spoiled children, and in after life discontented men. Again, from the same cause, rashness and cowardice, both proceed from the instinct of self-defence. According to Gall, we bring into the world with us the germs of an organization which is developed of itself and according to our growth, and from which result organs capable of acting to a certain extent, and liable to a greater or less excess, but which can be modified in some measure by a proper education.

IV.

Application of Gall's doctrine to different subjects.

It is evident that a being not completely master of his own actions, cannot be entirely responsible for them. If it does not depend upon myself to possess certain organs; if I cannot withdraw myself from the influence of certain causes; if not allowed to live in a country and under a government and belief which pleases me; if I cannot obtain the education which would suit me ; if I cannot resist madness, folly, or the diseases which in a thousand ways affect the reason ; if, in fact, I am not master of all the causes which produce my actions, evidently I cannot be solely and personally responsible for them. Do not let us overlook what I have already established in the preliminary discourse, viz. : that man has propensities common to animals, and peculiar faculties constituting him an intelligent and moral being. It has been proved, that owing to these two circumstances, the moral liberty of individuals is exceedingly different. Gall arranges into six classes the different intellectual and moral capacities which result from their combinations : either the proper faculties are very much developed and the animal faculties very little, or these last have attained a high degree of activity, and the first still remain very feeble ; circumstances which, at once, constitute two classes evidently very distinct. The two following are not less so ; either all the proper and animal faculties are very much developed, or in a moderate degree ; new circumstances which give rise to the third and fourth classes. Finally, some of the proper faculties alone have acquired a considerable degree of developement, whilst all the others remain moderate ; on the contrary, that as some of the animal faculties are developed, and all the others are moderate, whence arises the fifth and sixth classes.

These categories give rise to the following facts: men comprised in the first class act uprightly, with justice and wisdom; to them virtue is easy. Those comprised in the second, on the contrary, are addicted to sensuality and error, and abandon themselves to vice or acts of violence. Individuals of the third class, being subject both to animal propensities and proper faculties highly developed, are equally capable of great virtues and great vices, perform the most sublime actions and fall into the most degrading vices: whilst those of the fourth constitute that numerous class of men of ordinary capacity, incapable of producing anything remarkable. Finally, the fifth and sixth are composed of individuals exclusively devoted to one pursuit, without aptitude for any other. Those belonging to the former are endowed with one great and marked talent, but are distinguished for nothing beside. The latter are under the dominion of some one passion, which having no counterpoise, irresistibly leads them into great excesses, except when a proper education acts as a salutary check. It should also be remembered, that in general these circumstances are influential, in proportion to the unfrequency of self-examination, and the want of developement of the superior faculties. We are too generally under the influence of some obscure causes, prejudices, habits, or prepossessions, which militate against the equity of our determinations, and hence we rarely meet with an individual of so perfect an organization and whose natural dispositions have been so aided by a proper education, as to prevent his falling into errors in his opinion of others, and to endow him with that sense of justice, prudence and wisdom so much required in his progress through life; whence it follows that we should always look with indulgence on the foibles of our fellowmen.

From these considerations and others detailed in his work, Gall concludes that our present institutions are indispensable to compel men to *legal*, virtuous, and generous actions, and that it is absolutely necessary to strengthen and direct the faculties bestowed on us by nature, by education and exercise. And, in fact, according to the lights acquired by mankind on their nature and destination, will be their capacity to resist their evil propensities, to purify their manners, and to impress the proper degree of morality on their morals. But let them not deceive themselves, it is not by substituting for the true religion and beautiful system of morals of the scriptures, sterile dogmas and ceremonies or the prejudices and charlatanry of bigots and holy impostors, which are calculated rather to make dupes and slaves, as vicious as they are ignorant, than to communicate to man a feeling of his dignity, his rights and his duties, that a people will be elevated to virtue, acquire a love for labour, or a horror of vice and crime. It is not by deception, persecution, and an extinction of knowledge, that the prosperity of empires and the happiness of nations are to be ensured. The history of every age proves the madness and folly of those despots who endeavour to arrest the progress of civilization, and to substitute the odious privileges of feudal times for the more enlightened and beneficent institutions of the present day, and thus replunge nations into the gulf of barbarism and superstition from which they have scarce emerged.

Although Gall appears to be convinced of the impossibility of ever rendering the institutions of society so perfect as to annihilate crime, he still thinks that a general system of education is capable of diminishing, in a great degree, the prevalence of injustice; that ignorance is a more abundant source of crime than misery, whence he concludes that it is absolutely necessary to instruct a people, that they may acquire greater purity of manners and more elevation of thought. He is also of opinion that the system of correction and punishment, which society inflicts on its refractory members, is to a certain degree necessary, as whatever may be the state of perfection at which education may have arrived, it will never be sufficient to enable every individual to do good and avoid evil, and consequently that other checks or correctives must be employed; but he maintains that legislators, like moralists, have committed many important errors: 1st, in attributing the actions of every man to his will alone, thus supposing, whenever he commits a crime, that he did so willingly and knowingly: 2d, in thinking that coercion and stripes are sufficient of themselves to arrest or change evil habits: 3d, in considering every species of crime in a general point of view, without paying attention to the shades and differences that may result from the moral or internal character of the guilty individual, and which may impress a greater or less degree of culpability on his actions; 4th, in always proportioning the punishment to the mere act, regardless of circumstances which may render the crime more or less atrocious. According to him, every wise legislation should renounce the exercise of justice, as it is impossible to appreciate with perfect equity the influence of the different causes that may have concurred to the production of the criminal action, and that the only reasonable end that can be attained, "is to prevent infractions of the law and crime, to correct malefactors, and to prevent such as are incorrigible from invading the rights of society."

V.

Biography and cranioscopy of Dr. Gall.

John Joseph Gall was born in 1758, at Tiesenbrunn, in Wirtemburg, and died at Mont Rouge, near Paris, towards the end of the year 1828. His father, who was a tradesman, placed him whilst he was very young, under the care of one of his uncles, in the Duchy of Baden, that he might begin his education; Gall afterwards went to Strasburg to study medicine, and afterwards to Vienna, where he was admitted to the doctorate, and practised as a physician until the year 1805, when he left that capitol to visit his father, who was desirous of seeing him before his death, and to travel in the north of Germany, where he began to teach his new doctrine. Finally, he arrived in Paris, in 1808, where he continued until his death, the practice of his profession, and taught and published the various results of his researches.

An attentive examination of the cranium and head of this celebrated man, who was remarkable for his great intellectual capacity, has afforded me the following facts: that amnog the organs most highly developed, were those situated at the anterior and superior part of the forehead, as the faculty of induction, of wit, of abstraction and generalization, but above all, of benevolence. At the summit and sides of the head, the organs of firmness and perseverance, circumspection and cunning, or rather of ingenuity and skill, for although he has been accused of duplicity, I never remarked anything in him that really merited that name, were very prominent. The sexual propensity was also very strongly marked by the great size of the occiput. At the anterior and inferior part of the forehead, those of the memory of facts and philology were moderate. Finally, those of colours, music, mathematics, mechanics, and especially poetry, were very small, this latter so much so, that he had a kind of antipathy to versification of all kinds. All the other organs were moderate. The appearance of prominence in that of locality was caused by a corrugation of the skin, produced by his habit of deep thought.

To this may be added, a strong constitution, some corpulence, and imposing height; a gravity and energy in his movements, great earnestness and penetration in his look, his forehead often with a troubled expression, and his general expression rather serious than gay; always calm and circumspect; never indulging in loud laughter, but sometimes in an ironical smile, mingled with an expression of irony about his mouth and nostrils; a fine forehead, a somewhat prominent chin, a full face; a clear skin and fresh complexion, large lips, and deep rather than violent passions. The expression of his thoughts was always clear, precise, frequently picturesque, and sometimes authoritative. In his lectures the simple exposition of facts was the ordinary theme of his discourse; but in conversation and discussion, his favourite figures were interrogation, irony, and pre-supposition; the motion of his limbs and the attitudes of his body were very awkward, but the tone of voice, the accent and the air of his head and physiognomy were very expressive. Finally, a certain fund of German good nature redeemed some fits of humour a little overhasty, and certain expressions which were neither sufficiently softened nor innocent not to produce some excitement.

After death, the cranium being sawed with much precaution, on a line with the eyebrows, it was discovered that the sides were very thick, (nearly 3 lines,) and very solid; 2 ounces of a bloody fluid was afterwards found between the pia-mater and the dura-mater, and some excrescences, one of which was of the size of a pea; the cerebral substance was otherwise firm and in an almost natural state, although during the disease, the brain had been considered as the organ most seriously affected. The cap being taken off, the brain was removed from the bony box which contained it, into the cap, for the purpose of weighing it. The whole together weighed 4 lb. 0 oz. 1½ gr.; the cap alone when weighed afterwards, 1 lb. 5 oz. 1 gr.: thus the real weight of the brain disengaged from its meninges was 2 lb. 11 oz. ½ gr., and not 2 lb. 10 oz. 7½ gr., as was stated before my correction. Such a weight proclaims a brain whose dimensions are very near the maximum they could have attained.

It is evident from this, that in the sense which he attached to the word philosophy, Gall had a head in the highest degree philosophic. He was, in fact, ingenious in discovering the signs of eternal truths. He had an astonishing acuteness in penetrating things and seizing them in a point of view fertile in useful results; but, in my opinion, he was deficient in many faculties required to constitute a mind of the order of Descartes, Newton, Leibnitz, Wolf, &c., perhaps even of Bacon. With him, the comparative faculty and causality, were, it is true, strongly marked, but this faculty alone is not sufficient to found a system of severe and positive philosophy, which embraces at the same time the whole of man, and the series of wonderful phenomena which constitute the physical and moral order of the universe. Many organs, especially mathematics, arts, localities, &c. were so deficient in him as to prevent his attainment of such standing. But he possessed the organization necessary to fully appreciate human nature, and to lay the foundation of a true philosophy of man. Others with far less claims on our gratitude have been covered with immortal glory.

EXPLANATION OF THE PLATES.

PLATE I.

The different figures on this plate represent the three principal aspects of the head, viz. profile, full face and back, and exhibit the extent, form, and respective situation of the different organs. It should be noticed, that these indications of them must not be assumed as strictly applicable to every individual, as in nature there is sometimes a deviation. It may be remarked, that in fig. 2, number 24 is indicated by a kind of brace which includes that part of the forehead which, according to Gall, is the essential indication of a philosophical head. In fig. 1, the dotted line represents the separation between the cranium and the face, &c.

PLATE II.

Fig. 4, exhibits the cranium viewed in front, and fig. 5, in profile. Attention should be paid to the position of the organs number 14, 15, and 16, which are situated immediately over the bony vault of the orbit, and the effect of which, when much developed, is to cause a projection of the eyes. The line which passes over numbers 12, 21, and 26, is merely to mark the situation of the median suture, though it is only in young persons that this extends through the os frontis. In fig. 5, the line *b*, *c*, represents the suture which unites the frontal to the parietal bones: *a*, *b*, *d*, that between the temporal with frontal from *a* to *b*, and with the parietal from *b* to *d*. Finally, *d*, *e*, is a part of the lamdoidal suture, or that uniting the parietal bones to the occipital. The dark shade, *f*, *g*, indicates the situation of the occipital foramen or hole for the passage of the spinal marrow; a little above and before which the opening of the ear is marked by a small or dark spot.

PLATE III.

The figures on this plate represent three different views of the brain; in profile, fig. 6, above, fig. 7, and the base, fig. 8.

Fig. 1, exhibits the cerebellum *e*, *g*, *f*, which in man, as may be seen, is much smaller than the brain *a*, *b*, *c*. Its horizontal position should be noticed to comprehend the manner in which organ number 1, is represented in fig. 3, plate 1. In fig. 6, *d* marks the situation of the fissure of Sylvius, which separates the anterior lobe of the brain *d*, *a*, from the posterior *a*, *b*; and numbers 2, 3, 4, 5, 6, &c. mark the convolutions, regarded as the seat of the organs placed in the lateral parts of the head and corresponding to the Roman numerals, which, in the text, precede the name of each organ.

In fig. 7, the line *a*, *b*, represents what is termed the longitudinal sinus, which separates the two hemispheres *a*, *d*, *b*, and *a*, *c*, *d*. The anterior part *a* corresponds to the base of the forehead, and the part *b* to the lower portion of the occiput. As in fig. 6, the numbers placed on the convolutions indicate the situation of the organs situated in the upper and lateral parts of the brain.

Fig. 8, exhibits the base of the brain; it represents at 1 the two lobes of the cerebellum; *b*, the commencement of the spinal marrow; *a*, the anterior part of the brain corresponding to the root of the nose, and the numbers designate the organs which rest on the bony roofs of the orbits.

PLATE IV.

This gives a general view of the cerebro-spinal axis, or the nervous system of the life of relation, whose functions are under the influence of the will. It is composed, as may be seen, of the brain and cerebellum contained in the cranium, and of the medulla spinalis, or spinal marrow, contained in the vertebral column, which is also an essential part of the osseous system. From these various parts arise 43 pairs of perfectly symmetrical nerves, which are distributed to various parts of the body, either to receive and forward to the brain the impressions made on them by external objects, or to transmit the determinations of the will to the various instruments by which they are to be reduced to acts. The first eleven pairs of these nerves arise by various roots from the base of the brain, and leave the cranium by various openings or foramina, to be distributed to the organs of the senses, to other parts of the head, and even to some portions of the body. The first pair is composed of the olfactory nerves, and transmits to the brain impressions made by odours on the Schneiderian membrane of the nose. The second pair forms the optic nerves, and receives and forwards to the brain impressions made by rays of light on the retina.

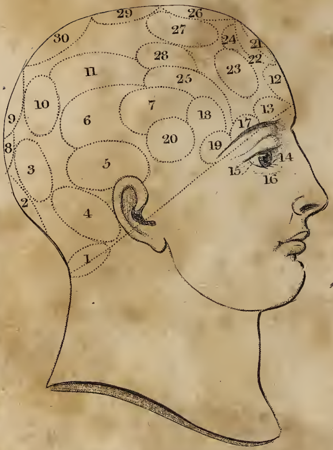
PLATE V.

FACULTIES OF MAN ACCORDING TO DR. SPURZHEIM.

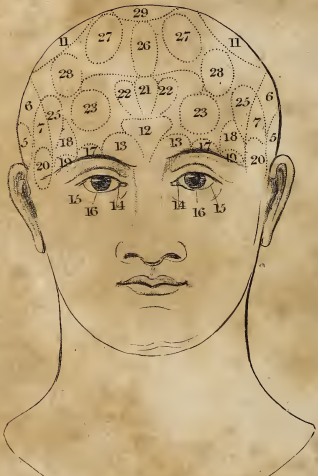
- Order I. *Affective Faculties.*
  - Genus I. *Propensities.*
    1. Amativeness.
    2. Philoprogenitiveness.
    3. Inhabitiveness.
    4. Adhesiveness or Attachment.
    5. Combativeness.
    6. Destructiveness.
    7. Constructiveness.
    8. Acquisitiveness.
    9. Secretiveness.
  - Genus II. *Sentiments.*
    10. Self-esteem.
    11. Love of Approbation.
    12. Cautiousness.
    13. Benevolence.
    14. Veneration.
    15. Firmness.
    16. Conscientiousness or Justice
    17. Hope.
    18. Marvellousness.
    19. Wit.
    20. Ideality.
    21. Imitation.
- Order II. *Intellectual Faculties.*
  - Genus III. *Perceptive Faculties.*
    22. Individuality.
    23. Form.
    24. Size.
    25. Weight and Resistance.
    26. Colour.
    27. Locality.
    28. Numeration.
    29. Order.
    30. Eventuality.
    31. Time.
    32. Melody or Tune.
  - Genus IV. *Reflective Faculties.*
    33. Language.
    34. Comparison.
    35. Causality.

Plate 1.

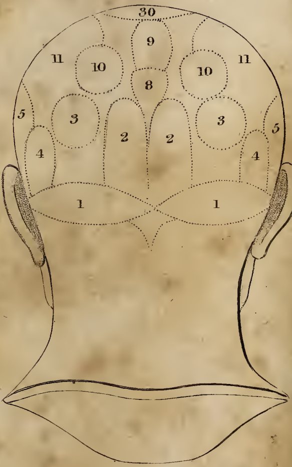
1



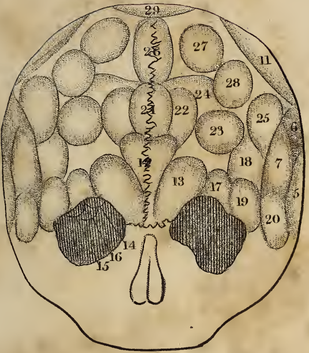
2



3



4



5

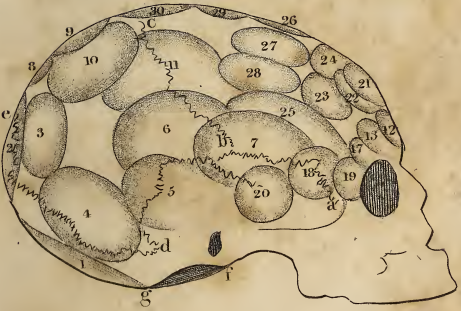
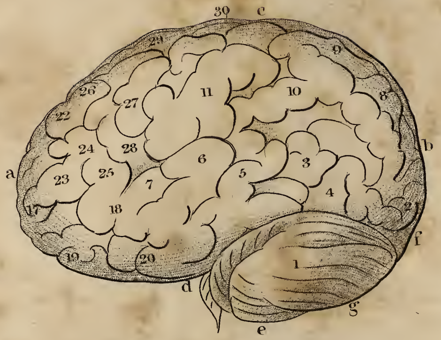
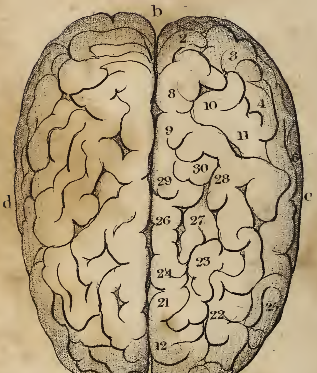

c
e
b
a
d
f
g

Plate 3.

6


30
c
29
9
26
27
11
10
8
22
24
28
b
6
3
a
23
25
5
7
4
17
18
2
f
1
19
20
d
g
e

7


b
2
3
8
10
4
9
11
6
30
29
28
c
d
26
27
23
24
21
22
25
12
13
a

8

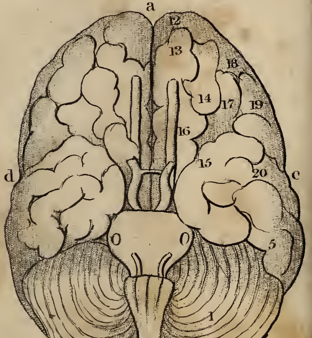

a
12
13
18
14
17
19
16
15
20
d
c
0
0
5
1
b

Plate 4.

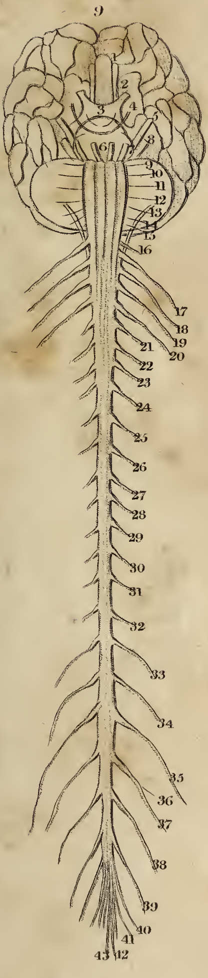
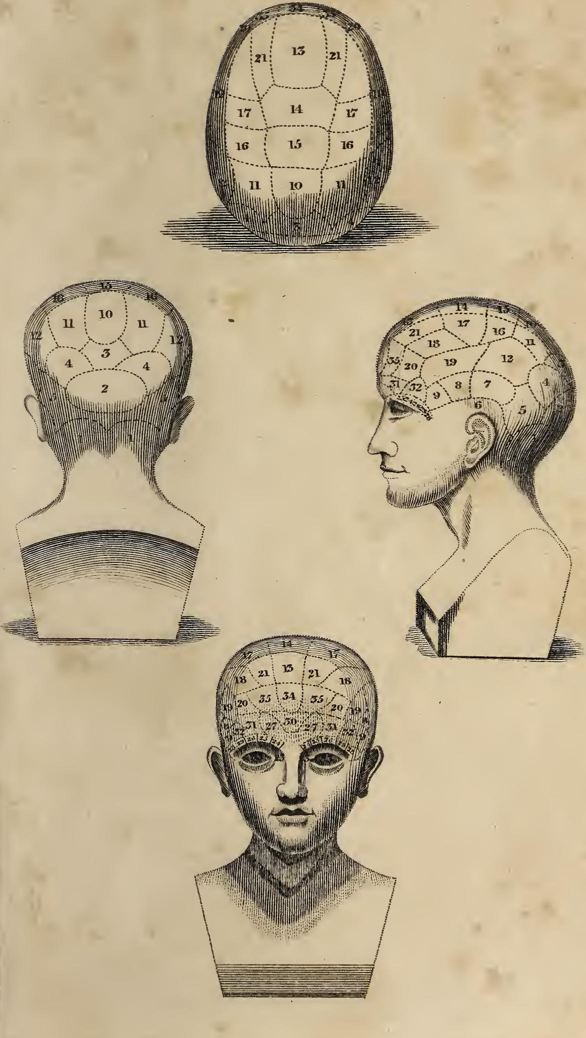

9
1
2
3
4
5
6
8
9
10
11
12
13
14
15
16
17
18
19
21
20
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
43
42

Plate 5.



University of Toronto
Library

DO NOT
REMOVE
THE
CARD
FROM
THIS
POCKET

Acme Library Card Pocket
LOWE-MARTIN CO. LIMITED